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HEALTH IN INDIA

FOR

BRITISH WOMEN.

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HEALTH IN INDIA

FOR

BRITISH WOMEN,

AND

ON THE PREVENTION OF DISEASE IN TROPICAL CLIMATES.



BY

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FOURTH EDITION.

LONDON:
J. & A. CHURCHILL, NEW BURLINGTON STREET.
1875.

151. o. 334.

LONDON:
SAVILL, EDWARDS AND CO., PRINTERS, CHANDOS STREET,
COVENT GARDEN.

PREFACE.

THE increasing interest now taken by the Anglo-Indian community in all that relates to health is our best assurance that in future we shall hold India at much less cost of life than hitherto. It was doubtless the growing strength of this feeling that prompted the Indian Government in 1871 to offer a prize for the best work on hygiene and family medicine, suitable to Anglo-Indians far removed from medical advice, and Dr. Moore's work* was published in 1874. A somewhat similar work† appeared last year, written by Dr. Mair, of Madras. I recommend these Handbooks to the attention of those going to India; for mine is not intended to supplant, but to supplement them, by treating fully of many important subjects relating to the health of women, of which their authors doubtless, purposely, took scant notice.

The nucleus of this little book was a chapter written for my "Handbook of Uterine Therapeutics,"

* "Manual of Family Medicine for India." Messrs. Churchill, New Burlington Street, London.

† "Medical Guide for Anglo-Indians." Heny S. King & Co., Cornhill, London.

that appeared in 1863 ; and, as an instance of the little attention that had been previously paid to the subject, I may mention that I only found three lines relating to women in the voluminous and still classic work of Dr. James Johnson and Sir Ranald Martin. I had therefore to rely chiefly on my own experience ; for, without having practised in tropical climates, I have frequently had under my care, during the last twenty-five years, patients invalided by uterine diseases from the East and West Indies, the Brazils, China, and Africa, for these different climates favour the development of such affections in the same way, however different may be their pathology in other respects. In addition to these favourable opportunities for studying the influence of tropical residence on the rise and progress of uterine diseases, my intimacy with Dr. Henry Bennet has placed his large experience at my disposal, so that my pathological teaching may be considered as representing the views of this distinguished pathologist as well as my own. I also availed myself of the experience of Sir Ranald Martin, Dr. Duncan Stewart, and Dr. Goodeve, whose names are household words in Indian homes.

I have enlarged the scope of the present edition ; for besides pointing out to medical men what I have found to be the evil effects of tropical climates on European women, and the best way of meeting the

mischief, I have made the work *a guide to life in India*, so as to enable our countrywomen to do the best under unfavourable circumstances for the maintenance or the recovery of health.

It is no doubt presumptuous on my part to meddle with matters of Indian statecraft, but I became so interested in many questions collateral to my chief aim, that I yielded to temptation and concluded with a chapter on Indian Colonization; but whatever value attaches to that part of the work is due to the assistance which I have received from the Right Hon. Sir Bartle Frere and the Rev. Dr. Badger, well known in India, both as a diplomatist and a clergyman. The recently published experience of Dr. Fayrer, Dr. de Renzy, Dr. Moore, and other Indian authorities, has guided me on sanitary questions, and I am indebted to my friend Mr. John Chippendale for having seen the work through the press.

EDWARD JOHN TILT.

60, GROSVENOR STREET,
GROSVENOR SQUARE,
April 28, 1875.

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HEALTH IN INDIA

FOR

BRITISH WOMEN.

CHAPTER I.

INTRODUCTION.

THERE is a land so ancient that we neither know when, nor where its most sacred language was spoken; so ancient that the features and the dress of its present inhabitants were sculptured on Egyptian temples by Sesostris, returning from his conquests some 1300 years before Christ. There is a land so immutable that when, some 2200 years ago, Alexander attempted its conquest, he found then as now, in the Punjab, fakeers sitting motionless in the sun from morn till eve, Brahmins preaching no surrender to the invader, sages uttering the wise saws of an already quaint antiquity, chiefs dressed in shawls identical with those to be now bought in Regent Street, elephants in battle array, and the ancestors of our Sikhs, the toughest of our foes, with a military organization so perfect that the Macedonian phalanx staggered and would follow no farther its glory-loving chief. Over this land, so little known except to its Mahometan invaders, there has ever hung a

halo of mystery; sages have placed there the scene of fairy tales in which the young seek amusement and find wisdom. It has ever been the classic land of romance, to which poets have resorted for materials to weave the tissues of their fictions; fantastic princes in gorgeous panoply, princesses weighed down by jewels from Golconda, scenery in which the magnificence of Eastern pomp was outdone by the inexhaustible variety of nature's luxuriance. Yet in the space of a century this wonderful country, with its 250 millions of varied races, has been conquered by the inhabitants of a little island set in northern seas, at a distance of 14,000 miles, until the opening of the overland route; the imperial and the subject races having nothing in common, except certain forms and fragments of language, so strangely similar that they must have been inherited from a common parent.

That we should have consolidated an empire by spending our own, as well as its treasure, in developing the country by roads, canals, railways and telegraphs, might have been expected from the enlightened policy and the mechanical genius of a gifted race. That we should have succeeded in striking the imagination of Orientals by the enactment, and the equal administration of just laws, might have been hoped; but we have even extorted their gratitude in showing them the high value we set on their lives by the everyday working of a widespread system of medical relief, and by our immense efforts to keep alive starving millions whom their native rulers would have inevitably let die.

There has been no such wholesome work of good government done in the last century; and we may

be proud of our work, while other nations look on it with ill-concealed amazement.

We could conquer India, but we succumb to its climate; and we can take no root there, as in North America and in Australia. Every additional year spent in India increases our liability to its diseases without lessening their fatality. As far as women are concerned, the various processes of the reproductive function are less perfectly performed; children must be sent home, or grow up sickly in mind and body. If a British family keeps its blood unalloyed, it dies out in a third generation; and when we cross our breed with the Hindoo, the Eurasian,* instead of exhibiting the good points of both stocks, often exhibits the vices of both races in a debilitated body.

The object of this little work is to enquire into all that relates to the health of our countrywomen in India, and after very roughly sketching the mighty country and its various climates, I shall draw attention to the four great factors of a tropical climate—heat, cold, damp, and malaria. Of Indian diseases to which both sexes are liable, I shall only glance at those that aggravate diseases of women, such as anæmia, which is both characteristic of Indian pathology and of a woman's constitution, malarious poisoning, hepatic diseases, and dysentery.

After some general remarks on the diseases of the native women of tropical countries, I state the effects of India on menstruation, pregnancy, parturition, and lactation; and I describe the forms of uterine disease, for which our countrywomen are most frequently inva-

* Eurasian, a contraction of Europe Asian.

lided, giving the general principles that should govern their treatment, but referring to other works for practical details. On the other hand, however, I have gone fully into all that relates to the Hygiene of European women in India, because I maintain that their chance of preserving health there depends on the degree of carefulness with which they follow these rules. After treating of what relates to the invaliding of women and the voyage home, I lay down the rules that should guide the treatment of uterine affections on their arrival in England, and I try to elucidate more accurately than has been previously done, the pathological tendencies and conditions that preclude any reasonable hope that our countrywomen can retain health in India.

In a concluding chapter, I consider the question of our being able to colonize India, and I show the impossibility of doing so, for reasons already summarized. Assuming that we are to hold India by a continuous recruital from the United Kingdom, I proceed to consider how we can minimize the "blood tax."

It is evident that to do so we must follow up the start already made in sanitary engineering, which by improving some towns and more stations, has sensibly diminished the rate of mortality of our troops in India. At the same time, we must bear in mind that the health of our countrymen does not only depend on the salubrity of the spot they inhabit, but is also greatly dependent on the sanitary state of the whole country. Hence, independently of what we owe to the natives, it behoves us to try and govern the country so that it may not be more unhealthy than

we found it. It is impossible to prevent disease availing itself of our railway system ; consequently an epidemic that used to be confined to a province may now overspread an empire. But surely British engineers are able to construct canals and railways without flooding the country and depopulating the districts by endemic fevers ; and they need not damage the lower provinces by over-draining the upper. Forests need not be recklessly cut down without judicious replanting ; and it must be borne in mind that, as the plains of Bengal are becoming more and more unable to oxidize the human excreta, of which they have been the secular depositories, to provide clean drinking water for millions becomes the first condition of health.

I conclude by suggesting that, if our fellow-countrymen could be induced to so modify national habits as to eat and drink less when in India than at home, it would take the sting out of a tropical climate ; a somewhat ignoble conclusion to a chapter that opened bravely, but human nature is full of such contrasts.

CHAPTER II.

CLIMATE OF INDIA AND ITS PHYSIOLOGICAL EFFECTS ON EUROPEANS.

THE Himalaya mountain-range, the highest known, is about 2000 miles in extent, and, while to the north it backs up the high table-lands of Central Asia, from the whole length of its southern side there slopes down a mighty and variously surfaced triangle with its apex at Cape Comorin, within nine degrees from the equator. This triangular shape was given to India by the central force that uplifted the Himalaya, and two other mountain ranges which traced out the coast line, and are known as the Western and Eastern Ghauts, at the junction of which rise the Neelgherry mountains. This vast triangle is cut in two by the Windaya range, which, starting from near Baroda, on the Western coast, takes a north-east direction, as if it were marching on Patna.

Whatever force uplifted the Ghauts and the Windaya, it did the like for the land they enclose, and thus formed the table-land of the Deccan, with its own river system, and a somewhat healthier climate, notwithstanding its nearer vicinity to the equator. Much lower than this table-land lie the northern plains of India from Peshawur to Calcutta ; plains

formed by the great Himalayan rivers, which have gradually deposited a black alluvial soil of considerable thickness. In other parts of India "there is a considerable extent of clay substratum. As the north-west and the Punjab are traversed, the country becomes more and more sandy, and returning southwards through Bhawulpoor, Bickaneer, and Marwar, into Guzerat, the whole surface is one vast sand tract. On the table-land of the Deccan the soil is of various qualities, generally loam or rock, but near the coasts it becomes sandy. In the province of Malabar, at the foot of the low hills or spurs of the Ghauts, it is a reddish clay. On the Coromandel coast the sandy soil continues to the foot of the Eastern Ghauts, which are of granite, and present a frightful barrenness. Rocks of trap formation, sandstone, and quartz are found in Malwah and Central India. The substratum of the soil in many parts of Hindustan proper is calcareous, in others clay or rock.

In his lately published prize essay, Mr. Moore has given the following sketch of Indian Meteorology:—

"The three great divisions of the year into hot, cold and rainy season are found to be more or less correct throughout the whole Indian peninsula, although in Scinde, some parts of the Punjaub, and in the North-Western parts of Hindustan generally, the rains are less violent, the cold more intense, and the heat quite as fervent. In Southern and Peninsular India, where these changes are governed by the monsoons, the alternations of dry and wet are pretty regular, although varying in different localities as to period of the year. Thus on the Malabar coast the

south-west monsoon commences about the middle of April, and continues till August or September, when it gradually loses its violence. Toward the end of October the north-east monsoon begins on this coast, blowing like the opposite winds, first on the southern part, and not being felt to the north for about a fortnight after. On the Coromandel coast the south-west monsoon commences in April, but does not blow violently till June, declining in September, the north-east commencing about the middle of October.

"On both coasts the setting in of the monsoon is generally accompanied with violent storms, most so on the Malabar coast, which is deluged with rain during the south-west winds, in consequence of the clouds brought by these blasts being intercepted by the lofty ridges of the western ghauts or mountains, thus affording a striking example of the manner in which natural obstacles modify the climates of whole districts. Where the clouds first strike the hill tops, several hundred inches of rain may fall, rapidly decreasing as the inland country is approached. Owing also to similar circumstances it is the dry season on the Coromandel coast. But at the northern termination of the western ghauts, the monsoon as far as it blows (about lat. 24° 44′) carries the rain without intermission over the whole country; again forcibly illustrating the difference of climate arising from natural obstructions. The rains of the eastern coast are not so violent as on the Malabar shores, and this again seems to be accounted for by the circumstance that the eastern ghauts are less elevated, also farther from the sea than the western, thus inter-

cepting and collecting a smaller proportion of clouds and vapour. From such causes the Carnatic has only about two months' rain, while in the Circars the wet season lasts much longer. But the province of Coimbetoor partakes of the wet season of the Malabar coast, this again being occasioned by a lowness or break in the ghauts in that locality.

"It has already been stated that the monsoons do not extend beyond lat. 24° 44′, and therefore the nothern parts of Hindustan have the dryest climate. During the months of July and August, and the early part of September—the rainy season in the southern part of India—the atmosphere in the north is generally clouded, but little rain, comparatively speaking, falls."

The climate of India may be figured as a succession of annual ague-fits, for every successive year brings its recurring stages of cold, of hot, and of sweating weather.

Cold Season.—This may be said to last in the plains during December, January and February, and in the hills November may be counted as another winter-month. The winter temperature of Calcutta is 67·8° Fahr., in the Deccan 76·2° Fahr. This gives an idea of the mean daily temperature during the cold season in the southern provinces of India, and at night the temperature is several degrees lower; but in the northern parts of India the cold season is marked by a very low temperature, for at night the mercury may fall below 30° Fahr., the water freezing in the tents. This great diurnal variation of heat and cold is felt through Rajpootana, in the Punjab,

and even so low southward as Agra and Allahabad, and Europeans are therefore more likely to retain health in these northern provinces.

The cold season is the pleasant time of the year, and it is well to time the going out to India or the return to it, so as to arrive there at the beginning of that season. Life is, however, far from pleasant then, in many of the hill stations, cold, rain, and snow being of frequent occurrence.

Hot Season.—In the plains, March, April, May, and the first half of June, are the hot months; but in some of the hill stations March is very bleak and windy. The mean temperature of Calcutta during the hot season is 83·3° Fahr., and in the Deccan it is 82·6° Fahr. In many parts of India the temperature is still higher; at Saugor, for instance, in Central India, during the summer of 1864, the temperature inside the house was 110° Fahr., although light was excluded, and the tatties and thermantidotes were brought into play; at night the temperature was 98° Fahr. The persistence of so high a temperature is very trying to Europeans in the Punjab plains, and in many parts of Central India, because the night is as hot as the day, and the air is motionless.

In Scinde, owing to the vicinity to desert lands and to the small amount of rainfall, the thermometer does not descend below 90° Fahr., and is oftener at 100° Fahr. during the months of June and July. Then is the time to make for the hills, where, according to the degree of elevation above the sea-level, the temperature is from 10° to 30° Fahr. lower than in the subjacent plains. The stations are

always placed above the reach of the parching winds that scour the plains and are fanned by the breeze that springs up at night.

Rainy Season.—Both in the plains and in the hills the rainy season extends over the last half of June, and during July, August, September, and October; but I have not been able to lay my hand on the mean temperature of our Eastern capitals during this season. It will be seen, however, that at Agra, during the rainy season, the day temperature was near on 100° F., and the night temperature was nearly 80° F. The following Table, for the materials of which I am indebted to Dr. Curran,* gives the comparative temperature and rainfall of Kussowlie, a small hill-station, forty-five miles from Umballa, and of Agra during the rainy season of 1870:—

	KUSSOWLIE.					AGRA.				
	Temperature.					Temperature.				
	Day.	Medium.	Night.	Winds.	Rainfall in Inches.	Day.	Medium.	Night.	Winds.	Rainfall in Inches.
1st to 30th April .	82	63	45	S.W.	3·8	98	82½	67	W.	None.
1st to 31st May .	92	76	60	S.W.	·8	99	87½	76	W.	None.
1st to 30th June .	...	...	...	S.W.	21·3	100	90	80	N.W.	12·3
1st to 31st July .	...	...	...	N.W.	20·6	103	92½	82	W.	12·1
1st to 31st August	80	69	58	N.W.	36·5	94	85	76	W.	6·
1st to 30th Sept. .	75	65	55	N.W.	16·5	96	86	76	W.	None.
Average .	82·25	68·37	54·5	...	99·5	98·33	87·08	76·16	...	30·4

* "Hill Stations for European Soldiers in India," *Dublin Quarterly Journal of Medicine*, vol. lii. 1871.

It must be noted, however, that in 1870 the rainfall was unusually small at Agra and excessive at Kussowlie, and that in the Neelgherry the rainfall is habitually less, being set down by Dr. Shortt as 50 inches at Kotergherry, 55 at Coonoor, and 60 at Ootacamund. The annual rainfall is greatest in the Western Ghauts—80 inches at Bombay, 122 at Andscharahandy, and 302 at Mahabaleshwar; whereas the average is small in the sheltered regions of the Deccan and Mysore, being only 22 inches at Poonah, 25 at Durroor, and 23 at Seringapatam. The rainfall is less on the Coromandel coast, for there falls annually 48 inches in Madras, and 58 in Calcutta. It is still less in the upper provinces as they are more and more removed from the monsoon, for it was 42 inches at Benares, 30 at Agra, and 23 at Delhi. There are said to be 102 rainy days at Bombay and on the Malabar coast, and 79 at Madras, Calcutta, and on the Coromandel coast. The rainy season is ushered in by stormy weather, in which thunder and lightning take part. There are storms in the hills, and the coasts of India are sometimes ravaged by disastrous cyclones; but there is a great deficiency of electrical phenomena in the central parts of India, and a corresponding deficiency of ozone, which is supposed to be the great antidote of the telluric poison we call malaria.

The rainy season is the most trying of the three, both in the plains and in the hills; and to realize its occasional miseries it is necessary to remember, that while the rain is falling, the day temperature, at least in the plains, is seldom less than 90° F., and that night does not always much diminish this tempe-

rature. In the plains the rainy season is chequered by many fine sunny days, and life is bearable during the continuance of a tropical downpour; but when it ceases, and the sun evaporates a considerable portion of rain, then it is like living in one of the hottest of the forcing-houses at Kew Gardens. A patient assures me that at Allahabad it is not uncommon for this state of things to last two or three days, and that she has known it continue for a fortnight.

Independently of these paroxysms of vapour-bath heat, moisture rules supreme during the rainy season: the air steams with it, it damps the clothes, soon mildews boots, and makes itself everywhere felt. In the hills the rainfall is great, and the heat during the day is sufficient to promote extensive evaporation, so the haze-drift is often dense enough to prevent seeing, as it were, across the road, and the sun may not come out till the middle of the day. At other times the rains are cold and drenching, so it will be easily understood that the hills are fatal to invalids during the rainy season.

To be going to India is a singularly vague expression, as far as concerns the chance of retaining health, which depends on the part of India wherein one's lot is to be cast. I can but roughly estimate the degree of health to be expected by Europeans in the great divisions of our Eastern Empire.

The Punjab.—This is said to be the healthiest part of India by a distinguished medical officer* of

* "Sanitary Improvement in India," by A. C. C. de Renzy, Surgeon-Major, late Sanitary Commissioner in the Punjab. *British Medical Journal*, 1872.

the Indian army, in a paper from which I shall largely quote. Malarious fevers assume a milder character than in other parts of India, hepatitis is less frequent, dysentery and diarrhœa less severe; but, on the other hand, rheumatism and diseases of the lungs are more frequent and dangerous. The only way we have of estimating the relative healthiness of different parts of India for Europeans, is the variable mortality of the British soldier in the different regions, because, wherever stationed, he continues to be the same specimen of British humanity, his clothing, diet, vices, mode of life are everywhere the same, so it is supposed that if he dies too frequently in any given spot, it is bad for Europeans to reside there. It is well, however, to bear in mind that the abodes of civilians and their habits of life are so different from that of soldiers living in barracks, that their rate of mortality is very different; and, on the other hand, competent engineers, at great expense, have constructed for the soldiers some stations much healthier than the surrounding country. This being borne in mind, it appears that, while the annual mortality of the British soldier in the United Kingdom is ·9 per cent., it was some years ·8 per cent. in the Punjab, and at others 3 per cent.; for in India the mortality is always liable to be swollen by some epidemic, even if not by cholera.

Madras.—This Presidency stands next in regard to healthiness. Its smaller area of marsh lands, and the greater facility that water finds to filter through its sandy districts, explains the less frequency of cholera, and why the mortality of our

soldiers is 4 per cent. per annum, and something less among the French troops at Pondicherry.

Bengal.—The greater unhealthiness of this Presidency is explained by the vast accumulation of alluvial soil and of stagnant water in plains, little raised above the sea-level, and our soldiers are said to die there at the rate of 7·5 per cent. per annum.

Bombay.—Here, the rate of mortality for soldiers is 5 per cent. per annum. This lower rate may be accounted for by the mountainous districts and the table-land of the Deccan, forming part of this Presidency.

Some idea of the climate in the Deccan may be formed from the fact that cabbages and cauliflowers grow very well at Aurungabad, Jaulnah, Mominabad, and at other stations, while strawberries are tolerably good.

LOCAL CLIMATES.

In so vast a country as India, there are many limited climates. Within a short distance from the coast line, the sea breeze blowing all day, and the land breeze blowing all night, favourably mitigates the heat of a tropical climate, and the greater abundance of ozone renders it healthier. On the other hand, the healthiness of the sea coast will vary with the prevailing wind. Columbo and the western side of Ceylon enjoys an improved Indian climate, while its eastern side, on which Trincomalee is situated, being exposed to the full fury of the north-east monsoon, is said to render lung diseases as fatal to our troops as Canada. A mountain range has only to so stretch

itself as to protect a district from north-east winds, and it will enclose a paradise, while on the other side the weather is wintry. Great rivers modify the climate of their neighbourhood : thus the climate of the lower provinces is not improved by the extensive inundation that follows the annual thirty-one feet rise of the Ganges, which is at its height in September. The Irrawady, on which Mandelay is built, has a fall of thirty feet, and at low tide visible vapour steams up for hours from a large exposure of drenched lands, of which all the scavengering is done by dogs—the accepted scavengers of Eastern lands, even in the days of Jezebel.

HILL STATIONS.

Hill stations are the best illustrations of local climates, and it is surprising that we should have been so long in India before it occurred to us that we had only to ascend sufficiently high in any mountain range to find a temperate climate. There is a health range in most Indian mountains ; that is, a plain or a slope on which, at times, the thermometer marks from 10° to 40° F. less than in the plains below ; an elevation in the midst of an air current quite independent of, and superior to, the parching winds that scour the plains below, or the hot stifling air that broods over them with motionless persistency. This health range is about the same in North and South India ; for, if Dr. Shortt looks on 4400 feet above sea-level, as still within fever range in South India, Dr. Curran speaks of Sabathoo, with its elevation of 4000 feet above sea-level, as only a half measure,

and the following is the height of several Himalayan hill stations :—

Dugshai	6000
Nynee Tal	6000
Kussowlie	6500
Landour	7000
Darjeeling	7600
Murree	7800

A locality that promises to make a healthy hill station may have maladies, fevers, and other diseases fatal to unacclimatized natives, and doubly so to Europeans; so their experience can alone show whether the locality is really suitable, and many a promising station has been given up, on finding that it told too severely on the health of the exploring party of soldiers, sent to reside there for a year.

All medical authorities agree that hill stations in India only serve the purpose of Brighton or Scarborough in England; that during the hot season they are admirably calculated to improve the health of those who are only debilitated by the heat; but that they are of no use to those who have structural diseases of any internal organ—diseases which are greatly aggravated by remaining in the hills during the rainy season, when haze or mist, clouds or rain, are very frequent. Although there be a comparative immunity from cholera, malaria, dysentery, and sunstroke in the hills, there is a greater liability to lung disease and rheumatism; and there is a very troublesome "Hill diarrhœa," or "Hill Trot," that seems to depend on the intestinal mucous membrane

having been so long accustomed to a uniform high temperature, that it resents being subjected to daily variations of temperature that in Himalayan stations may extend to 30° to 40° F.

If this tenesmic and flatulent diarrhœa depended on the drinking of water contaminated by sewage, the complaint would not be cured by returning to the plains, but would, on the contrary, be more prevalent there.

It is easy to understand from what precedes, that European children thrive in the hills, and that there are many flourishing schools like the Lawrence Aboo School, built on a hill detached from the Aravelli Range, and standing about 4500 feet above the sea, in the independent State of Serohee in Rajpootana.

For the same reason every effort is being made, under the administration of the present Commander-in-Chief, to increase the accommodation for troops at the various hill stations of India, and even now upwards of 9000 men, or nearly one-sixth of the whole army of India, are thus stationed. Of the Bengal Command over 7000 men are quartered in the hills: the remainder being drawn from the Bombay and Madras commands ; and, in addition to the above, there are 712 women and 1367 children at sanitaria in the Bengal Command.

Each Presidency has its hill stations. Calcutta has Parasnauth, at one day's journey ; Darjeeling, at two days' distance, and Simla at five.

In the Western Ghauts, Bombay has Matheran, Mahableshwar, and Malcompett, at an elevation of 4900 feet. Madras is still more favoured by its vicinity to the Neelgherries, at the junction of the

Western and Eastern Ghauts. The following description* will show that no station can vie with its natural advantages.

Owing to the great elevation at which the inhabited summit of the Neelgherries stands, and the consequent rarefaction of its atmosphere, aided, doubtless, in some degree by the beneficial influence of the luxuriant vegetation which clothes them, the district, although distant only eleven degrees from the equator, enjoys a climate now famed for its great salubrity and remarkable evenness in its seasons, with a mean annual temperature of 58·69° F., a temperature which falls in the coldest month of the year to the freezing point, and seldom in the hottest reaches 75° in the shade. In stating this I of course refer to the general circumstances of temperature which prevail, for seasons have of course occurred during which, from particular atmospheric causes, the mercury may have risen occasionally above this estimate. The coldest season is during the months of December and January, and the hottest about April and May, though this latter season is not as certain, depending mainly upon the character and time of setting in of the rainy or S.W. monsoon. The hottest period of the day is about two o'clock, or 2 h. 40 m., P.M., and the extreme range of temperature from sunrise to that time averages most commonly 16° throughout the year. The variation is of course the greatest at the time of frost, viz., January and December, when the extreme radiation

* "The Hill Ranges of Southern India," by John Shortt, M.D. 1868—71.

which goes on during clear nights produces excessive cold towards sunrise, after which the sun's rays, shining with great fierceness through the rarefied atmosphere, speedily restore heat to the earth, and the temperature of the air rises in proportion. Similar causes, reversed in their action, necessarily produce sudden and great cold after sunset, rendering the climate at this season, and indeed at all seasons more or less, one in which the most healthy residents, and especially those who have recently come under its influence, stand in need of caution in their mode of encountering its vicissitudes.

The chief station, Ootacamund, from its superior elevation, 7300 feet above the level of the sea, is more exposed to this unfavourable action than the two minor stations, Coonoor and Kotergherry, which are each 6000 feet above the level of the sea, although these latter are by no means exempt from the same influence, especially during the cold season.

A very great advantage, enjoyed by the Neelgherries as a sanatorium, exists in the means which are afforded to an invalid to select the peculiar kind of climate which best suits the malady under which he is suffering—by the existence of three settlements, each under a medical charge, situated in different parts of the range, each having a different aspect, and each a climate peculiar to itself: that of Ootacamund being the coldest, but most damp; Kotergherry, the next in the scale; and that of Coonoor the warmest. Thus an invalid, whose habits or state of constitution render the change from the torrid heat of the plains to the penetrating cold of Ootacamund too great and sudden, has the oppor-

tunity and option of acclimatizing himself at either of the minor stations before exposing himself to the vicissitudes of climate which await him on the highest level.

FACTORS OF A TROPICAL CLIMATE.

They are four—1, Heat; 2, Cold; 3, Damp; 4, Malaria; and it is well to state some of their effects on the human body before giving the result of their combined influence on Europeans in India.

Heat.—Of all forms of idolatry none is so respectable as the worship of the sun, for heat is the Almighty's right arm in the government of the world. As we approach the equator, chemical action becomes more and more active, rainfall and evaporation more abundant, vegetation increases in variety and luxuriance, animal life is exhibited after more and more numerous, larger, and more beautiful patterns. Man participates in the universal law that associates life with heat, for the two most numerous families of the human race, the Hindoo and the Chinese, have from time immemorial flourished on each side of the Himalayan range.

Heat rarefies the air, so that less oxygen is taken into the lungs in the act of breathing; the blood-corpuscles, taking up less oxygen, have less of it to distribute to the various organs and tissues of the body. Moreover, Messrs. Malassez and Picard have shown that in summer the number of blood-corpuscles in a given quantity of blood actually diminishes, so that during the long Indian summer there is a smaller number of those minute oxygen imbibers and distributors, and these two reasons

explain the tendency to anæmia to which I shall often refer. Moreover, it is known that the higher the temperature is in which we breathe, the less is the amount of carbonic acid exhaled from the lungs; and from the experiments of Vierordt, it appears that at an average atmospheric temperature 55° F., an adult ordinarily exhales from the body, by his lungs, as much as half a pound of carbon in the twenty-four hours; but that in a climate such as India, the average temperature of which is so much higher, not more than one-third of the above-mentioned amount of carbon is eliminated from the system by the lungs; and he also proves that there is a marked difference in the quantity of carbon got rid of from the blood by means of the lungs when the body is at rest and when it is enduring muscular exertion. Again, during sleep there is a still greater diminution in the exhalation of carbon as carbonic acid, and it will be seen a little further on, that it is possible to ascertain by direct measurement how much less work is done by European lungs in a tropical climate than they would do in a temperate zone.

The sun, when it has fair play—that is, when its heat is not damaged by stagnation of air or too much moisture—hardens what it touches, and we find men of white blood in full possession of all their energies in the greatest heat of India. Accordingly, it has been remarked by a well-known writer on military medicine, Dr. Robert Jackson, that in the East and West Indies, European troops were never so healthy as when actively engaged under solar influence, and never so sickly as when reposing

in barracks. The healthiness of the European troops engaged in the late siege of Delhi, under tremendous heat, was a matter of wonder, and our officers who still cultivate manly sports in India, notwithstanding the heat, enjoy much better health than their men, who snooze away a great part of the day in stuffy and darkened barracks. For myself, I never felt stronger than during the ten days spent in crossing the Desert from Gaza to Cairo, in the saddle all day, at the end of May, the thermometer ranging from 100° to 120° F. But the last day's march to Cairo lay through lower ground, better watered and more cultivated ; and although the thermometer was much lower, still the heat was overpowering and thirst intolerable. It was all the difference between a Turkish and a vapour bath.

Cold.—This is the most common cause of disease all over the world. It encounters the Esquimaux on leaving his suffocating snow-built hut, and Dr. Ravn, of Copenhagen, tells me, that nowhere is suppression of menstruation so common as in the Feroe Islands, where the women walk about with a bit of skin bound round their feet. In temperate climates cold meets us at every turn, and strange as it may sound, a large portion of disease in tropical countries is referrible to cold, for the thermometer in the shade, at noon and at midnight during the rainy season, may mark a difference of temperature which is often greater than in temperate countries. On the sea-coast, and in some other parts of India, where the ground is dry and the sky clear, the quantity of dew condensed on the trees is sometimes so great as to fall down like a shower of fine rain, and exposure

to night air may be well considered dangerous to health. Even during the six months of dry heat in many parts of India, not far distant from the sea, after long hours of dead calm, about two or three in the morning, there is a sudden fall in the thermometer, the air begins to move, so that those who are sleeping outside, or with the windows open, are in a draught, just at the time when vital power is at its minimum in the human body. Take Bangalore, one of the best stations in the Madras Presidency: for eight or nine months in the year, the nights are said to be so cold, that a couple of blankets are very acceptable, and in early morning the wind is sufficiently sharp to chap the face; but when the sun has risen, it strikes so hot that it is not reputed safe to move about, except in a carriage. The result is, that many are carried off by chest affections, or suffer from internal congestions and suppression of menstruation.

Besides the cold thus brought by diurnal changes, that are fortunately the rule in many parts of India, and the more marked effects of the monsoons in the more exposed parts of the country, the very appliances invented to reduce the temperature of Indian dwellings may cause disease by the injudicious application of the damp cold they produce. Thermantidotes diminish the temperature of a room 10° F., and they have been known to disturb menstruation and to cause inflammation of the womb in women sitting too near them when too lightly clad.*

Damp.—Damp may be associated with cold or

* Dr. Boggs, "Thèse de Paris," 1866.

with heat. If cold would only keep dry, one could live with it on very easy terms, but when combined with the penetrating influence of wet, it finds out our frailties and pounces on the weak organ. It is not necessary to go to the Hills, or to wait for the cold season, to meet with it. Lying in a draught of hot air when covered only by a longcloth garment, wet with perspiration, is all that is wanted to make acquaintance with wet cold.

A little reflection on what we frequently meet with at home will explain the damaging effect of damp heat. The barometer and thermometer may be the same, on bright sunny days and on close and muggy days, and yet we feel well and cheerful on the former, dull, weak, and depressed on the latter. In the first place, we cannot help being cheered by a sunny picture and depressed by a dismally gloomy one ; then warm, motionless air will not quickly remove from our skin the fluids it wants to get rid of. In addition to this, when the lungs receive air intimately combined with watery vapour, this may diminish the usual rapidity with which the exhausted blood globules become renovated by imbibing the oxygen of the air in the air-cells. Our occasional muggy days are represented in India by the rainy season, and during a considerable portion of it a vapour bath is not a bad description of the state of the atmosphere. This prolonged imperfect aëration of the blood sufficiently accounts for the notable languor and debility that is felt during the rainy season by those who have been accustomed to be braced up by sharply-defined changes of temperature, diurnal as well as seasonal. What we know of the functions

of the skin enables us to still better understand the phenomena of muggy weather in the rainy season, for it has been ascertained that the skin excretes a small quantity of carbonic acid, and it may be affirmed that a much larger quantity is regularly excreted from the hot, moist skin, which thereby permits of the lungs doing less work without damage to the system. Leube has shown that in Europe, when the skin is active the kidneys secrete less than their ordinary amount of urea, which Favre* has found to be a normal constituent of the perspiration of a healthy adult. It may therefore be assumed that in tropical countries the skin excretes a larger quantity of urea. This compensatory action may, to a certain extent, prevent uræmia and the damaging of the urinary apparatus by too highly concentrated urine. During the rainy season the skin can ill perform this double function, and the oppression and exhaustion that are often felt are partly due to blood poisoning by carbonic acid and by urea. Besides, it must be borne in mind that although sweating is a nuisance, it is a condition of health in a tropical climate; so if the air is fully charged with aqueous vapour and will not relieve the body of what is extruded from the skin, the blood gets more or less poisoned. In like manner certain organs can get on well, so long as the neighbouring skin acts freely, but become diseased when the skin does not do so. While the head perspires there is no fear of sunstroke.

* *Vide* his analysis of healthy urine in the Author's work on "Change of Life." Third Edition. Messrs. Churchill, London, 1870.

Malaria.—I spoke of dry heat as a tonic; it is also anti-putrid, it parches foliage to crumbling dust, and mummifies the camel that drops exhausted in the desert; but moist heat favours putrefaction, and when vegetable and animal substances decay in stagnant water that process of decay engenders a subtle influence that has never been seen. It is called a miasm or malaria, and is supposed to be an exhalation of poisonous gas that rides on the wings of vapour and falls with the dew. It is the penalty of misapplied water, the price demanded for the fertility conferred upon a land by great rains and rivers. Malaria is most virulent as the equator is approached, where it helps to check a too abundant population. The effects of this telluric poison vary in the same country, and in India, malarious fever is different, in one of its great territorial divisions, from what it is in another. This may depend on some peculiarities in the fauna, the flora, and the soil of each malarial nursery-ground. It is not, however, given to all paludal chemistry to evolve malaria, for the water-logged marshes of Taiti and of New Caledonia have been well turned up without causing intermittent fever. French pathologists say it is because these marshes rest on coral reefs, but this will not explain why the paludal districts of Monte Video and Buenos Ayres are free from ague, and why so paludal a country as Paraguay gives rise to rare and easily curable intermittents. In like manner it has been also occasionally remarked in India, that the wind may blow from certain marsh lands without giving rise to fever. This shows that we have still much to learn respecting the etiology of ague;

but it does not justify the belief that malaria is a myth, and that all intermittent and remittent fevers are due to the sole action of cold on the human body. If water would only persist in covering the jungles, marshes, and river banks of India, there would be little malaria—I say little, for it is the belief of many Indian doctors that water may hold the *quid ignotum* of malaria in solution, and then let it loose on the air; but, as a rule, when the water drains away, it leaves uncovered the decaying vegetable refuse of a previous season, and exposes the mass of animal and vegetable things with which teams the mud of tropical lands. This decomposes, and when the scorching sun has cracked the surface into innumerable fissures many feet deep, malaria rises from the ground. Hence it is the natural produce of alluvial plains; it lies heavily on clay, is less noxious on a sandy and gravelly soil, and it is still less frequently met with on a ferruginous bed. The great forests that are now being ruthlessly cut down, used to let pass the pure air, while they retained and decomposed the poisonous miasmata.

When freshwater and seawater fauna and flora decay in diluted seawater, the telluric poison is still more virulent. Man contaminates the ground on which he has continued to live for centuries; the dust accumulated by successive generations of men cannot be turned up without its disengaging malaria more or less detrimental to health. This applies principally to venerable towns like Jerusalem or Rome; but it also holds good to a limited extent in the vast plains of Bengal, inhabited by millions from countless ages, the hotbed of malaria and the birthplace of cholera.

Dr. Alexander Rattray, R.N., has tried* to estimate, with scientific precision, some of the changes induced in Europeans by their passing into the tropics, changes to which I have already drawn attention at page 25 ; but his observations require to be continued by other observers in a higher temperature than 82° F.

His paper consists of a series of tabular results obtained during a passage from England to the Cape of Good Hope and back, supplemented here and there by some commentary or summary statement. The temperature did not reach that of an Indian climate, but it was, near the equator, 82° F., and from 55° to 65° F. in the South, and from 52° to 56° F. in the North temperate zone. The tables set forth the effect of tropical climate on respiration ; the climatic spirometric range at different ages ; the spirometric measurement of the lungs, the number of respirations in relation to the temperature ; and the effect of climate on bodily development. Dr. Rattray considers that one of his tables shows that tropical heat interferes much with the bodily growth and development, as indicated by the weight, retarding it in most and stopping it in some individuals. Both the number who grew and the amount of increase, as shown by the tables, were least in the tropics ; and the author points out that "If we would produce strong, healthy, long-lived officers and seamen, fit for any work or climate, we should not send them unnecessarily to warm regions while as yet undeveloped lads." This remark certainly applies to our country-

* "Proceedings of the Royal Society for 1872."

women, in whom I have noted the too-early going out to India as a primary cause of subsequent ill-health.

The following are among the chief results and inferences of Dr. Rattray's experiments. "The primary effect of great changes of climate is on the circulation, the blood being drawn surfaceward by heat, and driven inward by cold. The secondary and local effect is an increase or decrease in the vascularity and function of the various tissues and organs of the entire body—the external increasing under heat, the internal under cold, and *vice versâ*. Hence in the tropics the vascularity of the adult lungs is reduced by an average of 12 or 13 fluid ounces; their spirometric measurement by an average of 23 cubic inches; their function by 18·43 per cent.—*i.e.*, the use of 36·85 cubic feet less air daily, excretion of 1·84 oz. less carbon, and 6·57 per cent. less of watery vapour. The nephritic vascularity and secretion are also reduced by 17½ per cent., and those of the skin increased by 24 per cent. In unison with the respiration, the circulation is more languid in the tropics, as indicated by the pulse being reduced several beats, and by its being perhaps less forcible. The temperature of the surface, and probably that of the blood and body generally, on the other hand, rises about 2° F. under tropical heat. The organs and functions of animal, like those of vegetable, life are affected by great changes of climate, heat impairing the weight, strength, and health at all ages, and retarding growth in youth; while cold has an opposite effect. Collectively, these changes are salutary, no doubt, and meant to assimi-

late the various organs, functions, and body of the inhabitants of one zone to those of the native races, to meet the requirements of the foreign climate, for which they are not, however, and perhaps never can be altogether, physiologically fitted."

Notwithstanding these changes, on arriving in India, Europeans of both sexes in the prime of life are in a state of plethora when compared with the inhabitants of the country; so much so, that only a few years ago Dr. Rufz, who practised at Martinique, and Dr. Rochoux at Guadeloupe, recommended the bleeding of new comers to reduce this plethora. The practice is not wanted, for nature does something similar by diminishing appetite and by promoting perspiration. This is brought about by the dilatation of the cutaneous blood-vessels and the consequent enlargement of the vascular area, which produces the same effect upon the circulation as venesection, for it is a kind of bleeding of the patient into his own vessels. This sweating process cannot go on for seven months without diminishing the amount of blood circulating in the system, and the number of the blood corpuscules floating in a given quantity of blood, and without diminishing the relative quantity of oxygen habitually taken up by these corpuscules. I reserve the name of *Anæmia* for the state of body that I have thus described, which is more marked in women than in men, because they are constitutionally prone to anæmia.

This gradual diminution in the bulk of the blood is an eminently conservative process, and is perfectly consistent with health, in those who are healthy when they reach India, and who will consent to live

temperately and prudently. With regard to the manner in which India affects the spirits and the tone of Europeans, those who have spent a year in the plains will admit having experienced some of the first effects of the climate of the West Indies on the French, which have been graphically described by a French physician* who practised at Martinique, and who has well studied its climate: "Le premier effet du climat des Antilles sur l'arrivant est une sorte d'excitation générale, qui produit une sentiment de force inaccoutumé et d'activité; toutes les distances paraissent petites, toutes les fatigues sont hardiment abordées; mais les gens du pays rient sous cape de toute cette effervescence, car ils ont été souvent témoins de sa durée éphémère. En effet, après quatre ou cinq jours, déjà cette ardeur est tombée, le corps s'alourdit, les fonctions s'alanguissent; une pesanteur de tête s'oppose au libre exercise de l'intelligence; il semble à mesure que le soleil monte sur l'horizon, qu'il se lève en même temps une vapeur, une lourde ivresse qui trouble la pensée. On éprouve une horreur du mouvement, un besoin de repos plus irresistible que celui dont on se moque dans les habitants du pays; on n'agit plus que par secousse, et aux moindres agitations on fond tout en eau; et cette transpiration, qu'on augmente par un excès intempestif de boisson, est énervante. . . . Le sommeil n'est pas réparateur; on se réveille le corps lourd, la tête embarrassée, comme après des nuits blanches d'Europe. Le regard perd sa vivacité,

* "Etudes historiques et statistiques sur la Martinique," by Dr. Rufz.

la désinvolture du corps est empreinte de nonchalance ; il faut être bien petit-maître pour que les soins de la toilette ne s'en ressentent pas. La coloration du visage reste rouge pendant quelque temps ; mais cette injection n'est pas celle d'une coloration vive et riche, elle tourne au violet, revient longtemps après que la pression du doigt l'a chassée des capillaires, et la respiration, souvent suspireuse, indique une mauvaise hématose."

The combined effects of a tropical climate and of great fatigue on a picked body of healthy men in the prime of manhood, and well-seasoned to tropical life by a long residence in India, are well described by Dr. Troup in his letter to Dr. Parkes* on the use of stimulants :—"A remark made by a staff officer engaged in the Red River expedition was very suggestive. He said, 'We lived on the climate then, but here the climate lives on us.' No truer remark could have been made, for, on all alike, officer and soldier, the climate was telling. The system looked as if it were undergoing a gradual decay ; the excessive amount of cutaneous perspiration and the great loss of muscular vigour caused a blanched and anæmic appearance. In many cases an unusual depression of spirits followed as well as irritability of temper. This I noted more especially after the excitement was over, and when we had to march over old ground with but little change of scenery, passing through forest and jungle of a very monotonous character, and in our journey through which we were

* "Report on the Issue of a Spirit Ration during the march to Coomassie." London, Messrs. Churchill, 1875.

unable to get a glimpse of the horizon, I may say from Cape Coast Castle to Coomassie." I am not aware that an attempt has been made to estimate how long an average Anglo-Saxon constitution can stand India without breaking down; but I think it is rightly admitted that women break down sooner than men. Neither can I profess an opinion on Dr. Mair's assertion, from his Madras experience, that women can command from six to eight years of fair health before breaking down. Keeping within the limit of what I believe to have been ascertained, I submit that transplantation to India has a marked effect on the reproductive organs of British women. Menstruation is often more abundant, or in the same women it may be so in the plains and become moderate in the hills. It has been long ago noticed by the honoured patriarch of the Indian Medical Service, the late Sir Ranald Martin, that English women are more liable to miscarry in India, particularly during the hot season, and under the influence of malaria. Flooding is a more frequent attendant on parturition, which often causes dysentery, a frequent cause of death in childbed for our countrywomen in India, where English women can seldom suckle their children.

CHAPTER III.

INDIAN PATHOLOGY.

A CAREFUL study of the human frame brings home to the physiologist the conviction of the perfection with which it was planned to enable man to make for himself a home anywhere between the equator and the poles. For this intent the various organs by whose action life is carried on were also endowed with a compensating power, so that while some of them should be gifted with most energetic action in a hot climate, others might work hardest to sustain life in cold regions; but what the Creator made perfect, man has taken no trouble to transmit faultless to his descendants. He is remarkably clever about the breeding of cattle; and when he marries, man often takes care of what relates to religion, position, purse, and temper, but he does not concern himself in the least to find out whether the framework and constitution of his future mate are likely to blend well with his own constitution and framework. Whether some parental blot is to be irrevocably stamped on his children is a matter of little importance to him, until the actual result stares him fully in the face. As this has been going on for so many thousands of years, while Christian charity and medical skill have vied in keeping alive diseased fellow-creatures till they could do their best to damage the constitutions of

future generations, the wonder is that there are so many sound people left. Many are, however, only apparently sound, and when extreme climates put their strain on the human machinery, the want of vital elasticity of one organ, the latent defect of another, the comparative helplessness of the whole system becomes apparent, and it is then seen that climate governs pathology. Temperate climates, with their endless variety of seasonal changes, have a most diversified pathology. Extreme climates, in which one month follows another in stereotyped monotony, have a more restricted pathology. Ross or Parry, in their Arctic discoveries, have little to put down but frost-bites, snow-blindness, and scurvy as a disease to be prevented; and in India, where the weather of the three seasons has a reliable fixity, half-a-dozen diseases monopolize attention, unless cholera come to diversify the scene, when it reigns supreme in the lonely majesty of an all-devouring plague. Climate governs mortality, for of all the officers and men who in thirty-two ships have explored the Arctic regions since 1848, there only died 1½ per cent. per annum, while 7½ was the annual mortality of Bengal, even when no epidemic swells the death-rate.

The rate of mortality in England is remarkably steady compared with the fluctuation of the death-rate of various stations in India. Thus, Dr. de Renzy mentions, that "At Jalundhur, for six years, the average death-rate was under 8 per 1000; but in 1868 and 1869 it shot up to upwards of 30 per 1000. Stations ordinarily healthy are subject to fatal epidemic outbursts; and, conversely, stations ordinarily unhealthy

have short intervals of freedom from epidemic sickness. It will be further observed that some of the worst explosions of pestilence occurred so late as 1867 and 1869. In Peshawur, in 1867, the troops lost 12 per cent. of their strength, and 14 per cent. in 1869. Morar lost 11 per cent., Saugor 8 per cent., and Allahabad 15 per cent., in 1869. These losses were mostly due to cholera. In the same year, Mianmir and Jalundhur lost heavily from typhoid fever. Facts like these show that, as yet, there is no effectual security, in Indian cantonments, against the recurrence of pestilence. That a station remains free from epidemic sickness is due rather to good fortune than to permanent safeguards." In fact, it is no more possible to count on an Indian death-rate than on the temper of its people, and when an Oriental has lulled his ruler into the conviction that he will ever bear everything with imperturbable equanimity, he most inexplicably bounds up into a very cyclone of destructive activity; settling down when once its fury is exhausted into that perfect calm that succeeds a tropical storm.

It is characteristic of tropical diseases that they predispose their victims to increasingly severe attacks, that they are common among the natives, although more fatal to Europeans, and that they pick out from among the latter the strongest-looking and the new-comers.

I am purposely incomplete and sketchy in this chapter, and I would not treat of diseases common to both sexes, if they did not cause or aggravate some of those peculiar to women, so I only propose to say a few words on those tropical complaints that

cause, modify, or intensify diseases of women. I mean—1, Spanæmia; 2, Malarious Complaints; 3, Biliary Affections; 4, Dysentery.

1. *Spanæmia.*—Words are the landmarks of science, and they should not be lightly removed; but the terms having been used as equivalents, I am not coining a new word, if I reserve the term Anæmia to the changes in the system, that I have just ascribed to the physiological action of a tropical climate on healthy Europeans, and which should be considered as an attempt at acclimatization, while I give the term Spanæmia to that state of the system in which the quantity of the blood is not only diminished but more or less poisoned by being charged with waste matters, there being also a considerable diminution of blood corpuscles and an occasional deficiency of the fibrin of the blood.

Spanæmia frequently affects the natives, and Sir R. Martin pointed it out long ago as the one pathological condition common to Europeans suffering from various tropical diseases. Spanæmia may be the first visible sign of want of change; it is the invariable accompaniment and sequence of malarious poisoning; if there be considerable enlargement of the spleen, it floods the blood with white corpuscles. Gastric and liver disease increase the impoverishment of the blood, diarrhœa and dysentery diminish its amount; so that, in a practical point of view, the question that has often to be asked is, whether the blood has not been so damaged by tropical life as to render it advisable for the patient to return home? If placed under similar conditions, spanæmia is more marked in women than in men; it depends on

differences in the texture of her tissues and in the composition of her blood, as compared with those of man; differences that render her so liable to some form or other of spanæmia, even in England, where it is seldom observed in man.

2. *Malarious Diseases.* — Long-continued heat having debilitated the system, malaria poisons the blood and the nervous system. This is the second link in the chain of Indian pathology, or rather its *Deus ex machinâ.* It is *the* tropical disease above all others, and its tropical nature is written in the succession of phenomena that mark a fit of ague, which remind one of the cold, the hot, and the rainy seasons of the tropical year. The natives suffer much from malarious diseases, particularly when they pass from their own paludal district to another, in some other part of India. When malaria causes ague, it may vary in intensity from the mild intermittent that accompanied Baron Haussman's upturning of the soil of Paris, to the pernicious fevers bred in the delta of the Niger.

In India fever is rife on the drying up of decayed vegetable refuse, when there is a lull of the rains, and on their subsidence. There is less fever during heavy rains, and when during unhealthy seasons the rains have been long delayed, fever assumes an aggravated form, or becomes remittent. Were malaria merely to cause the intermittent and remittent fevers of various parts of India, its scope would be far too wide; but the arch-fiend meddles with whatever disease may be progressing, and stamps it with its remittent type. Malaria may be just as busy, in a more insidious way, engorging the spleen, the liver, the bowels, and even the womb, without any previous

attack of fever; the presence of the poison in the system being made known by the colour of the skin, the indescribable "*malaise*," and the impossibility of throwing off local complaints, however judicious the treatment. The less exposed life of English ladies renders them less liable than men to severe attacks of Indian fevers; but they frequently suffer from dumb ague and the more insidious forms of malarious poisoning. As the womb is intimately connected by ganglionic nerves and by the portal circulation with the viscera that suffer most from malaria, this has probably a more marked influence over the womb than we are aware of; for, with the exception of the assertion that malaria congests the womb, I am not aware that the subject has attracted attention. Staff-Surgeon Odell told me that he had repeatedly noticed an aggravation in the symptoms of uterine disease, and more particularly an increase in the vaginal discharge, every third or fourth day. Dr. Horton has placed on record the fact, that on the Gold Coast, malaria may seriously affect the fœtus in utero, through the medium of the mother's blood. His observations seem to refer to native women, suffering from fever; and the children came into the world with enlarged spleens, that grew rapidly after birth—a serious matter at a time of life when the spleen has its greatest functional activity, and may overflow the blood with white corpuscles. The same observer has also noted that considerable enlargement of the spleen leads to menorrhagia, as well as to loss of blood from other mucous membranes.

When once Indian malaria has taken strong hold of an English constitution, there is no telling when it

will let go its grasp, and many a long-returned old Indian will own to the distress, physical and mental, that he has occasionally to endure for a few days, till the blessing of a fit of ague comes to put an end to his misery. Colonel Tulloch's statistics of intermittent fever would give a very inadequate idea of the vast range of malaria in Indian pathology; but he came to the conclusion that most cases of disease in India were due to malaria, and most cases of death to hepatitis. It has been lately argued that all these varied and complicated phenomena are the sole result of cold acting on the heated body. Were this the case, there would be as much ague in England as in India, and if in India ague were independent of paludal parentage, cold would produce one and the same kind of ague, instead of a dozen well-marked varieties. All who have travelled in hot countries know right well, that cold precipitates the floating poison, and intensifies its action, which may be often counteracted by whatever may promote warmth of body; but cold has quite enough to answer for already, without being saddled with the entire results of malaria.

One word on typhoid fever, which does not seem to be strictly an Indian disease. Its casual occurrence had been occasionally noticed by Indian doctors during the last fifteen years, and if it has been very prevalent in Bengal during the past five years, this may depend on the increasing unhealthiness of its alluvial plains.

3. *Biliary Affections.*—It is well to call affections by their chief characteristics; but liver disease always implies more or less disturbance of the stomach, and

of the duodenum. Experiment has shown that one of the effects of a high temperature upon the lower animals is to produce a degeneration of the parenchyma of the liver, its secreting cells becoming filled with minute granules and presenting appearances similar to those found after death from febrile diseases.* It is possible, then, that some of the functional derangements of the liver from which persons suffer in tropical climates may be owing to similar degenerations, not necessarily permanent, of the secreting cells, and that in like manner, tropical heat may be a sufficient cause of hepatic disease.

Dr. Copland ascribed the prevalence of liver diseases, amongst the European residents in tropical countries, to the liver being larger and its secretions more copious in the European, than in the Negro and in the Mongol races; but Mr. Robert Clarke, who has been colonial surgeon at Sierra Leone, and who had abundant opportunities of testing the value of this assertion in hospital practice, has not observed any difference in the size of the liver in the Negro and in the European, and Mr. Chippendale confirms this statement from necroscopic observations in the West Indies.

It was not unreasonable to suppose that, as the Negro is not liable to yellow fever, so the Hindoo is not liable to hepatitis; but the researches of Dr. Morehead, and still more recent writers, have fully established the fact that the temperate, rice-eating Hindoos suffer from hepatitis, though not so frequently as Europeans. Thus, whilst in the European

* "Pathological Transactions," vol. xxiv. p. 266.

hospital at Bombay, over 7 per cent. of deaths are due to hepatitis, this disease only carries off 3 per cent. of the patients in the exclusively native hospital of Jamsetjee Jejeebhoy, in the same city.

It is admitted that in a temperate climate the liver of a man weighing eleven stone secretes every day about forty ounces of bile, the greater part of which is reabsorbed, assisting in the assimilation of fat and peptones, and probably in those chemical changes which go on in the liver and portal circulation; while part is excrementitious, and in passing along the bowel, stimulates peristalsis and arrests decomposition. The early writers on tropical diseases only knew of the liver as thus secreting bile, for it was reserved for modern physiologists to discover that the liver forms glycogen, which contributes to the maintenance of animal heat, and to the nutrition of the blood and tissues, and the development of white blood-corpuscles. Much of the nitrogenized waste is the result of the splitting up of albuminous matter in the liver, the resulting products being glycogen and tyrosine, creatine, creatinine, and the other early forms of azotised waste, which by oxidation become converted into uric acid and urea. In consequence of the poisonous characters of these waste matters, they are eliminated from the body by various emunctories, and the amount at one time within the organism is usually kept under by the action of one or more of the excretory systems. It is evident that tropical pathologists have to estimate the effect of India, on each and all of these separate functions of the liver, before they can explain its diseases. As yet we can only deal with clinical facts,

and it is well to start from the well-known one, that summer is the season for biliary affections in temperate climates, and that when our invalids go to the South of France as fast as express trains can carry them, if they leave cold weather in England, to find it unusually warm on the Riviera, they often have a very bad bilious attack. However temperate Europeans may be, the fact that in India the liver has to do its own work and part of that of the lungs, makes our countrymen prone to biliary affections, and I draw attention to the following forms of disease:—1st, Biliary hypersecretion; 2nd, Congestion of the liver; 3rd, Fatty degeneration; 4th, Inflammation of the liver; 5th, Abscess of the liver; 6th, Bilious remittent fever. With regard to hypersecretion of bile, it frequently occurs that healthy and temperate young men, soon after their arrival in India, injudiciously expose themselves to the midday sun. This is soon followed by diarrhœa and the passing of large quantities of bile—a critical discharge that it would be wrong to check. It is not because their liver is larger, that our countrymen suffer so much in India from congestion and fatty degeneration of the liver, but because, having been accustomed to eat and drink freely at home, they continue to do so in India. To enlarge the livers of geese to manufacture "Pâtés de foie gras" the animals are kept in a dark, warm, and confined space, and they are stuffed with highly carbonaceous food. This process is to a certain extent followed by British men and women in India during the hot season, and in our management of the soldier, we have copied the proceeding with a success well calculated to excite the admiration of the experimental

physiologist. Dr. Jackson, the well-known writer on military medicine, suggested that in tropical stations the British soldier should abstain from meat two days a week, but when doing duty as surgeon to the first European Bengal Fusileers, at Dinapore, in 1855, Mr. Macnamara* found the young Scotch and Irish recruits consuming 76 ounces of solid food a day, whereas the allowance per day, to a man in the Royal Navy was only 35 ounces. These men, of course, spent their money in drink, and they snoozed away the greatest part of the day in *dark*, *hot*, and muggy barrack-rooms. The microscope showed that their blood contained numerous oil-globules, that in some, the liver was infiltrated with oil, while, in process of time, the liver cells changed to fatty globules. The liver no longer being able to make sugar and urea, the kidneys had to do double work and also took on fatty degeneration, so did the heart and the blood-vessels, and the poor men died of uræmic poison, of abscess of the liver, or apoplexy, with an annual mortality of 80 per cent., the death-rate of their officers being only 10 per cent. per annum. In all probability they were just as intemperate as their men, but they had better food and stimulants, healthier abodes, and their active exercise in the intense sunlight helped the liver to do its work. Can it be true, what I see stated by Dr. Jules Rochaud,† that hepatitis is scarcely known in the Indian possessions of the French?

* "On Fatty Degeneration of the Liver," *Indian Annals of Medical Science*, vol. iii.

† Art. "Climat," "Nouveau Dictionnaire de Médecine et de Chirurgie Pratique."

If it can be true, the fact would speak volumes in favour of more temperate habits, for it is roughly stated that our hospitals in India are half full of cases of disease of the liver. When we occupied Cabool, part of the force marched quickly from Scindh, where the thermometer was at 135° F., to Cabool, where they found it at 75° F., and some of the officers were immediately jaundiced, others had diarrhœa and hepatitis; this explains how when once the liver is permanently congested, any check to perspiration by wind or otherwise in the plains, and still more so in the hills, may bring on hepatitis.

I have shown elsewhere* how suppression of menstruation and chronic uterine inflammation is sometimes accompanied by long-continued functional derangement of the stomach and of the liver, with occasional formidable outpourings of bile, upwards and downwards; and Sir James Simpson and Dr. Butler Lane have confirmed my teaching. This depends on the nervous connexion between the liver and the womb, and upon its veins forming part of the portal circulation. Derangements of menstruation and chronic uterine disease in India react more frequently and more intensely on the liver, and the sedentary habits of women promote liver complications.

4. *Dysentery.*—This is a thoroughly tropical disease, for the Blue Books show that some years, at

* "On Diseases of Menstruation and on Uterine and Ovarian Inflammation." Third Edition, 1862. Messrs. Churchill, New Burlington Street, London.

Ceylon and at Hong Kong, our Indian soldiers suffered just as much from dysentery, as our own soldiers. Dysentery may occur suddenly, but it is often the climax of a tropical breaking up, having been preceded by malarian poisoning and hepatitis. Dysentery does not respect teetotallers, and its greater fatality in the intemperate depends as much on the imprudences that follow intemperance, as on alcoholic poisoning.

It is just after the rainy season, when malaria is most active, that dysentery is most frequent, and as in the West Indies, so in the East, one attack paves the way for another, each becoming more and more grave, and being often the concluding act of the tropical tragedy. Dysentery tells heavily on our countrywomen, and to understand why, it is sufficient to remember that the organs of reproduction, as well as the intestines, are principally supplied with ganglionic nerves, that the spinal nerves of the womb and of the intestines arise from the same part of the spinal cord, that the last portions of both canals are contiguous, these being relieved by the same vessels, and supplied by nerves either derived from the same ganglionic nervous plexuses or from the same portion of the spinal cord.

As the result of this intimate connexion, I drew attention, many years ago, in the work last quoted, to the fact that the bowels were, generally speaking, relaxed during menstruation, that diarrhœa sometimes attends pregnancy and cervical inflammation, and I added, that "chronic inflammation of the body of the womb generally causes irritation of the lower bowel, which is evidenced by a considerable increase of mucus

accompanying the motions, sometimes by small quantities of blood, sometimes by frequent tenesmic diarrhœa, sometimes by constipation depending on a want of power to expel the fæculent matter, as if on account of semi-paralysis of the rectum, and sometimes upon the constriction of that portion of the intestine—a mechanical effect of its pressure by the retroverted womb. Dr. H. Bennet, Dr. Butler Lane, Scanzoni, Aran, and Nonat have confirmed my statements; the latter treats of this complaint as a special form of enteritis."

Dr. Duncan Stewart assures me, that when women were brought into the native hospital of Calcutta, as suffering from dysentery, he has repeatedly shown the pupils that the dysentery was caused by inflammation of the womb. It is the propinquity and solidarity of these two intestines, the nutritive and the generative, that explains why dysentery is no uncommon cause of miscarriage and of premature confinement to European women in India, and why it so frequently accompanies or follows parturition—so much so, that when death "in childbed" is announced in an Indian paper, it is generally added, "of dysentery."

Other Diseases.—Women can avoid sunstroke, but they cannot always escape heat apoplexy, when the temperature is very high, the air still, the sky clouded all over, and the heat radiated from the walls, which having been baked in the sun's rays in the daytime, makes the atmosphere indescribably oppressive.

Consumption, which is more common than is *generally believed* among the natives, marches rapidly

when our countrymen are attacked with it. Bronchitis may be expected in the rainy season, but other pulmonary complaints are rare. A French doctor, who was several years at Saigon, in Cochin China, only met with four cases of pleurisy and one of pneumonia. Rheumatism may be expected wherever, as in the hills, the days are hot and the nights cold.

CHAPTER IV.

DISEASES OF EUROPEAN WOMEN IN INDIA.

"IN towns surrounded by stagnant water, well protected from the north, but open to hot winds, women are sickly and subject to menorrhagia. Many are sterile, not from any abnormal formation of the womb, but owing to some disease of the reproductive organs, and they, therefore, frequently miscarry."

Such is the graphic account given by Hippocrates, in the first work on climate, of the effects of a hot and malarious district on the reproductive organs of women. Before our own times, however, it was not understood that in tropical countries ovario-uterine affections are as frequent and as various as in the temperate regions of the globe. It is erroneous to suppose that these affections are the result of an over-refined state of civilization, for they are frequently found amongst the unirritable women of less civilized races. Thus, my friend Dr. Duncan Stewart, late Professor of Midwifery in the Medical College of Calcutta, and Physician to the Hospital for Native Women, was forcibly struck by the frequency of uterine affections amongst the natives of India, both of high and low caste, and his statement is confirmed by the native practitioners, who, from being looked upon with less jealousy by their countrymen, have had better opportunities for observation; and particularly

by Madoosudun Goopta, whose record of lesions met with in the dissecting-room of the Native Female Hospital of Calcutta, I extract from the fourth edition of Dr. H. Bennet's work on Inflammation of the Uterus :—

Memorandum of the Condition of the Genital Organs in the Bodies of of Fifty Native Indian Women, who had Died of Various Diseases. By MADOOSUDUN GOOPTA, S.A.S.

No.	Age	Uterus.	Cervix and Os Uteri.	Ovaries and Fallopian Tubes.
1	46	Natural	Natural	Fallopian tubes obliterated.
2	50	Small, hard	Os rigid and contracted ...	Ovaries shrivelled.
3	35	Natural	Os irregular, a tumour on one side	Left ovary much diseased.
4	40	Ditto	Healthy	Healthy.
5	24	Ditto	Cervix much inflamed, os ulcerated	Left ovary enlarged and inflamed.
6	34	Ditto	Os and cervix ulcerated ...	Fallopian tubes strictured.
7	45	Ditto	Os closed	Both ovaries absorbed.
8	50	Ditto	Fungous tumour	Left Fallopian tube obliterated.
9	25	Ditto	Os widely open.....	Both ovaries healthy.
10	27	Enlarged by recent pregnancy, inflamed	Inflamed	Ovaries, &c., inflamed.
11	50	Swollen and soft ...	Os ulcerated	Healthy.
12	30	Natural	Os scirrhous, deep ulcers.	Ovaries natural.
13	42	Ditto	Cervix swollen	One Fallopian tube obliterated.
14	40	Ditto	Os ulcerated	Natural.
15	30	Large and inflamed	Lacerated ulcers	General redness.
16	27	Natural	Cervix inflamed, os ulcerated	Tubes and ovaries adherent.
17	30	Gravid.....	Cervix inflamed, os extensively ulcerated...	General inflammation.
18	28	Natural	Cervix swollen, soft.....	Ovaries sound.
19	50	Prolapsed	Not unhealthy	Natural.
20	30	Natural	Cervix ulcerated, os raw and open	Right Fallopian tube obliterated.
21	50	Ditto	Os irregular, hard.....	Ovaries absorbed.
22	36	Sloughing	Cancerous ulcers	Inflamed.
23	27	Natural	Cervix and os inflamed ...	Natural.
24	45	Ditto	Ditto	Ditto.
25	46	Ditto	Os obliterated	Ovaries absorbed.
26	40	Fatty degeneration	Cervix and os ulcerated ...	Ovaries absorbed.
27	25	Natural	Tubercles in cervix	Ovaries red.
28	30	Ditto	Natural	Healthy.
29	29	Displaced fundus adherent to rectum	Cervix long and large, bent slightly backward	Natural.
30	30	Natural	Ulcers within the canal of the cervix.....	Ovaries very hard.

No.	Age	Uterus.	Cervix and Os Uteri.	Ovaries and Fallopian Tubes.
31	30	Natural	Healthy	Fallopian tubes adherent.
32	40	Ditto	Cervix and os congested	Healthy.
33	50	Ditto	Healthy	Hydatids in left ovary.
34	45	Ditto	Ulcers in cervix	Ovaries sound, Fallopian tubes obliterated.
35	45	Ditto	Healthy	Scirrhus of right ovary.
36	65	Displaced to right side, hard and swollen	Cervix much ulcerated	Ovaries congested, Fallopian tubes obliterated.
37	65	Natural	Natural	Right ovary atrophied.
38	60	Hard and small	Cervix hard, os small	Ovaries small.
39	50	Natural	Cervix swollen and red	Healthy.
40	30	Ditto	Natural	Ditto.
41	19	Ditto	Ditto	Ditto.
42	50	Fibrous tumour of the fundus	Ditto	Natural.
43	40	Natural	Os very red, abraded	Natural.
44	35	Ditto	Natural	Right ovary very hard and horny.
45	28	Long neck	Ditto	Healthy.
46	42	Natural	Cervix fissured and hard; os red, abrasion	Left ovary corrugated.
47	32	Large and soft	Reddish	Natural.
48	13	Natural	Natural	Undeveloped.
49	26	Ditto	Ditto	Natural.
50	22	Healthy	Extensively lacerated	Inflamed.

With regard to the nature of the ovario-uterine diseases that came under observation, Dr. D. Stewart, and Dr. Scott, the chief medical officer of the Madras Hospital for Diseases of Native Women, also assert that, whether it be studied at the bedside or in the dissecting-room, uterine inflammation presents the same appearances in the Hindoo as in the European. Mr. Robert Clarke, who was colonial surgeon at Sierra Leone for twenty years, informs me that amenorrhœa, dysmenorrhœa, leucorrhœa, and profuse menstruation, are as frequent in negro women as in English, but that hysteria is very rare. Dr. Kirkman Finlay, Superintendent of the hospital in Trinidad, likewise assures me that the native women are seldom without suffering from some form or other of uterine disease, and the French creoles aptly indicate their chief cause of complaint by calling it *mal de mère.*

With regard to the probable causes of uterine diseases amongst the native races of tropical countries, one cause is, the calling into action of the sexual organs long before their full development. In India, this is the result of a positive religious injunction ; and in other tropical countries, an equally early indulgence in venery often occurs, on the first impulse of passion, amongst races little restrained by social position or the dictates of morality ; and indeed, no matter the latitude, wherever woman is but a plaything in the hand of degraded savages.* The great liability to abortion, accidentally and often intentionally brought on ; the barbarous handling of unskilful midwives ; the too early rising from the puerperal couch ; the want of cleanliness in some races, and sudden changes of temperature, are the principal causes of ovario-uterine disease amongst the native races. That European women when residing in a tropical climate are thereby made more liable to diseases of the reproductive organs, scarcely requires proof ; and it is well to begin this inquiry by stating the probable number of women to whom it may refer.

* "Esquimaux women marry and live with their husbands long before they menstruate."—*Dr. Richard King's Replies to the Author's Questions.*

"Amongst the aborigines of South Australia, girls are betrothed and live with their husbands from eight to twelve years of age. They practise sexual intercourse from their eighth year upwards. Childbearing commences at about sixteen years of age, when girls cease to be public property, and live quietly with their husbands."—*Mr. James Hersbash's Replies to the Author's Questions.*

The celebrated Abyssinian traveller, Antoine d'Abaddie, informed me that the legal age of marriage in Nubia is twelve ; that he has known girls married at ten, and others to have been bought and used for sexual purposes long before they menstruated.

I gather from Sir R. Martin's admirable papers,* on the sanitary state of the British Army in India, that there were then attached to our large garrison in India, 19,306 women and girls enumerated as "British-born subjects in India," of whom 9717 were twenty years of age and upwards, including 7570 wives, 1146 widows, and 1001 unmarried women. 786 wives were under the age of twenty. The number of wives of English origin, under the age of forty-five, scattered all over India, was said to be 7626.

The mortality amongst the wives of officers does not appear to be very great, if we judge by the rate of the mortality of wives and widows on the Madras Military Fund, for, according to the published returns, the casualties among the wives and widows belonging to that Presidency, from the age of 20 to 40, average 14 in 1000 annually; but then it must be borne in mind that after a few years' stay in India many return to Europe. The wives and children of the non-commissioned officers and soldiers do not fare so well as those belonging to the superior ranks, and they must remain in India, although the provision for their accommodation is very inadequate. These women, including those of English birth and the Eurasians, were said to be exposed to great hardships, and to die at the rate of 35 per 1000.

From more recent reports, Dr. de Renzy estimates the death-rate of soldiers' wives, usually young healthy women, and either little addicted to intemperance, or having small means of indulging the vice, at from

* *Lancet*, 1868.

25 to 54 per 1000; and that of soldiers' children from 75 to 145 per 1000.

In the Calcutta School for Daughters of European Parents, and in the Lawrence Asylum for Soldiers' Children, the mortality of the children is far from excessive.

In estimating the comparative frequency of uterine affections in the European residents of tropical climates, it must therefore be borne in mind, that, whether in India or in our other tropical possessions, European women are generally young. They leave Great Britain at about twenty, and seldom remain in India after forty, thus passing, in a hot climate, the best part of that period of life in which uterine disease is most common, even in temperate regions. This remark is made as a safeguard against exaggeration; but I am fully prepared to concur, with those who have practised in tropical countries, that during their stay in India our countrywomen are unusually prone to disturbed action of the reproductive organs, and particularly to ovario-uterine disease. Dr. Stewart does not hesitate to say, that eight out of ten of the European female residents are habitually subject to deranged menstruation, leucorrhœa, or to cervical inflammation.

Perhaps this frequency may be caused by the circumstance that the sexual organs are principally supplied with ganglionic nerves, which are evidently most implicated in malarious diseases.

When we intend a plant to thrive in a soil different from that in which it had grown, it is not only removed carefully, but left for a time in undisturbed repose to take root in its new habitation. There is,

however, seldom a healthful period of repose for our young countrywomen who are transplanted from England to India. Even when the menstrual function has been habitually healthy, it is often disturbed by the sea voyage, and is not allowed to become regular before these young emigrants are launched, often for the first time, into the gaieties and fatigues of society, which, in such a climate, are far more fatiguing than at home. In the midst of the excitement caused by this sudden introduction to a strange country and a new position, they frequently marry, often at too early an age; for out of 7624 wives 786 were under twenty years of age. Thus placed in circumstances adverse to health, women find themselves the more sought after because they are few in number, and they naturally enough give themselves up to the pursuit of pleasure, and set at defiance the laws of hygiene. They take little care of themselves at monthly periods, so the menstrual flow becomes too frequent or too abundant, or is too painful. Even in England, when this goes on for a few months, women get weak and anæmic; still more so in India, and before long the colourless lips and the sallow cheeks denote that climate has intensified the effects of neglected hygienic rules. There is an effort made to continue fashionable life at one of our Eastern capitals, but the effort induces abdominal pains, nervousness, depression of spirits, and perhaps hysteria. Tonics are taken with little utility, and as the patient grows worse friends get uneasy and a change to the hills is recommended. Suppose, on the contrary, the lady be married; if bent on pleasure she seldom takes more care of

herself during pregnancy than during menstruation, and a miscarriage is a likely event, followed by so speedy a getting up that the womb remains permanently enlarged, and therefore destined to be more or less permanently congested, irritated, if not ulcerated. Another miscarriage follows, or pregnancy may proceed to its full time. There is a fruitless attempt to nurse, a bad getting up, no power to rally, vaginal discharges, abdominal and back pains, increased by exercise; so the patient is further debilitated by confinement to the house. Tonics do little or no good, surgical treatment has not the desired effect, for the sore tissues will not heal. The hills are tried, but although the patient derives benefit, she cannot get well, and is sent home. The journey home does great good, and pains and aches are for a time subdued by improved health and by pleasurable excitement—only for a time, for believing in recovered health, the patient over-walks and over-exerts her strength. Then the old symptoms return, are detected and cured in a few months by a proper combination of medical and of surgical measures. It sometimes occurs, that on returning home the patient will come across some medical man utterly ignorant of the now generally admitted benefit to be derived from the surgical treatment of morbid states of the womb, and who says to her—"Do not believe what your Indian doctor tells you; iron and quinine and change will suffice to cure you, now you are at home." Accordingly, she follows his advice, is sometimes better, sometimes worse, but is seldom without some uterine symptoms, and as the time approaches for the return to India she, or her friends, get nervous

and feel anxious to allay all fear by the opinion of some recognised authority. The patient comes in with profuse apologies for seeking advice about so slight an ailment, and says she has taken her passage to India, but would like to have an opinion before starting; and to her surprise she learns that her stay in England has been time lost, and that if she goes out to India by the following mail, she will soon be sent back again. I never pass a year without meeting one or two such cases.

A few words on the influence of India on menstruation, pregnancy, parturition, and lactation, before considering the rise and progress of diseases of the womb in tropical climates.

Menstruation.—If when women are transplanted from temperate regions to tropical countries, frequent perturbations of the menstrual function may be expected, even in those in whom that function had been previously regular, it is not surprising that menstruation, when morbid in England, becomes more so in India, and that, instead of the usual moderate flow, it is entirely absent or very profuse. A patient, who has suffered considerably from congestion of the womb and ulceration of the cervix, tells me, that during the four or five months of the hot season, at Calcutta, she was scarcely ever without a sanguineous uterine discharge, whereas, during the cold season, she menstruated about every sixth week. This lady assures me that many of her friends are similarly affected, the menstrual discharge being more and more pallid, as the patients become more and more anæmic. Another lady, suffering from a considerable amount of uterine hypertrophy and inflammation,

noticed that the flow was always menorrhagic when she was stationed in the plains, and that it was always normal when she was in the hills. Dr. Horton observes that amenorrhœa is not uncommon when malaria has merely enlarged the spleen; but when this organ is inflamed or very much enlarged, it overcharges the blood with white corpuscles and disposes to additional loss of blood from the uterine, as from other mucous membranes.

Some patients have been just as regular in India as in England.

Pregnancy.—Besides the well known causes of miscarriages and of premature confinements, they are frequently brought on by fever, or diarrhœa, or dysentery, or the long continued heat of the hot season. The difficulty our countrywomen have to recover from miscarriages has been long ago noted by Sir Ranald Martin. The explanation has been given in another place,* where I have pointed out that there is, unfortunately, no fixed time agreed upon by the profession, or sanctioned by custom, during which, after a miscarriage, a woman ought to keep her bed and her room, and abstain from exercise as well as from duties, social and conjugal. Their too early resumption stops uterine involution or the gradual inshrinking of the enlarged womb. I said this of England, but in India, where it is often beyond the scope of the womb's recuperative power to reduce itself, this enlarged womb remains a permanent menace of disease.

* "On the Prevention of Uterine Inflammation," *British Medical Association Journal*, 1873.

Parturition.—So great is the tendency to puerperal hæmorrhage in India, that it used to be a frequent practice for our countrywomen to return to Europe for their confinement, so as to avoid profuse flooding. Dysentery is, however, the chief danger that India adds to the dangers of parturition, and I need only repeat that it is of frequent occurrence, and is not unfrequently fatal. Tetanus is also an occasional attendant on miscarriages and on parturition, and with this, as with other surgical causes of this singular disease, it is not the severity of the lesion that predisposes to tetanus, but some unknown meteorological conditions, in virtue of which, in certain given years, the slightest lesion may bring on lockjaw. Tetanus during parturition has been observed in Paris by Velpeau ; it is known to occur in the West Indian Islands, and has been occasionally caused there by the introduction of ice into the womb to stop post-partum flooding.

Puerperal tetanus occurs all over India, but is more frequent in Bombay because of its inexplicable liability to tetanus, for up to 1853, that disease was reported as the cause of death there, in one out of every forty-six deaths from all causes. In the three years ending in December, 1853, there died in Bombay of puerperal tetanus 232 women ; I suppose, native women, for Dr. Waring,* who gives these figures, does not say whether the women were native or European. During those three years, tetanus engrossed the bulk of puerperal mortality in Bombay, for there were only twenty-one fatal cases of puerperal

* "*Annals* of Indian Medicine," vol. viii.

fever, two of puerperal convulsions, while one woman died of phlegmasia dolens. Dr. Lardier* has written on puerperal tetanus, but I have not seen his work.

Lactation.—Dr. Moore says that in India our countrywomen are able to suckle their first child, but that they can rarely do so on a second occasion, on account of the debility that has generally been caused by heat, malaria, and disease. This accords with what patients have frequently told me. Of course there are exceptional cases, like that of a young lady, who soon after being cured by me of a severe attack of uterine inflammation, married, went to India, did very well, and enjoyed good health while nursing for sixteen months. This greater inability to nurse in India than in England, helps to explain the frequency of uterine disease in India, for I still believe that the act of suckling promotes the return of the womb to its proper size, and is a healthy stimulus for the uterus, except in some cases of extensive cervical ulceration, which will not heal until the child be weaned. Whenever non-involution has been well marked, I have usually been told that the patient had been unable to nurse, and Aran found, that out of one hundred women in whom parturition was soon followed by uterine disease, seventy had not suckled.

Uterine Disease.—I take it for granted that the medical reader of this work is fairly grounded in uterine pathology, and it would be quite out of place my repeating here, what may be found in many excellent works on that subject, that have ap-

* "Thèse de Paris," 1874.

peared during the last twenty years, and if he wishes to know the result of the author's experience in the treatment of diseases of women, he will find it in another work.* Of course, I admit that English women in India are liable to every kind of disease of the womb; but when I speak of uterine disease as of frequent occurrence in India, and severe enough to render it advisable for the patient to return home, I mean more or less acute inflammation of the womb, of which I have met with two varieties in patients sent to me from India. In the least common variety the cervix is alone affected; it is not much enlarged, the mucous membrane covering it is red, and the mouth of the womb is more or less ulcerated and patulous. Generally, the lining membrane of the cervix is in a similar state, and from it there flows a yellow discharge, which is not always abundant enough to be noticed by the patient; while in other cases its abundance is what troubles her most. In addition to this, there are the usual uterine symptoms, local and general, and I have chiefly met with this form of uterine disease in the unmarried, or in married women who have never had any family. I have observed the second and most frequent variety of uterine disease in women who have borne children. In this variety, the cervix is just as I have described, only much larger, more patulous, and often retroverted; but the gravity of the case depends on the body of the womb being implicated. It is often two or three times too large, and, as a rule, I ascribe this increase

* "*Handbook* of Uterine Therapeutics and of Diseases of *Women.*" *Third Edition*, 1868. Messrs. Churchill, London.

of size to defective involution. It is not only enlarged, but diseased ; sometimes the softness of the uterine walls, as felt by the finger in the vagina, and the pain caused by pressure, enable me to say that the substance of the womb is inflamed ; more frequently there is no pain on pressure ; but the watery or bloody uterine discharges, and the habitually disordered state of menstruation, point to internal metritis. In England these pathological conditions are quite enough to disable a woman. What with abdominal pains or sickness, or hysterical phenomena when keeping quiet, and the aggravation of these symptoms when walking is attempted, the case is serious ; but far more so, when a tropical climate has so undermined a woman's strength as to have diminished her of power to rally, and in such cases the return home is indispensable. I have been taken to task for not having given a more prominent part to congestion of the womb, as a frequent pathological result of India ; but I never anticipated that any medical man could have supposed that the conditions above described could have come into existence without having been preceded by long-continued congestion. Patients have gone far beyond that state when they come to me ; indeed, women have such a natural aversion to being examined, that few pathologists in any country are called upon to recognise simple uterine congestion.

With regard to the causes of uterine disease in India, besides the imprudences that women are accustomed to commit at the menstrual periods, and defective uterine involution, to which I have attached so great an importance, there is that anæmia to

which all women are predisposed, sure to be intensified by tropical heat, if not by malaria, which may act unawares, for the evening drive is on the banks of a river or of some large tank of stagnant water, and those who sit or drive may inhale malaria with the cool damp breeze. Tropical anæmia is not only caused by habitually intense heat, and by malaria, but also by the comparative inactivity and complete change of habits, which too often impart a certain amount of oriental indolence to the once hardy Englishwoman. It is well known that this confirmed debility renders all the abdominal viscera very liable to congestion; and there is no reason why the womb should escape this influence, or why it should not be then more readily acted on by its usual exciting causes of inflammation.

All writers agree that, in Tropical Climates, diseases are principally caused by the action of cold on the frame debilitated by heat, and they look on the damp, cold nights as the frequent cause of fevers, cholera, and dysentery. Dr. Aubert Roche, who practised for four years at Suez, states, that ninety per cent. of all diseases were caused by the exposure of the perspiring body to the refreshing winds of evening and night, which are saturated with dew. It is easy to understand that women, oppressed with heat and panting for fresh air, should seek relief by exposing themselves imprudently to the sea-breeze, to the north-east wind, or to the icy chill of a raw, dewy night, inadequately protected by scanty European clothing, more or less saturated by perspiration; *while the* loose but ample folds of the trousers and *belts, worn by the* women of most Eastern nations,

are better calculated to prevent the injurious action of cold on the pelvic viscera. When in India, Dr. Boggs repeatedly traced uterine disease to sitting too near Thermantidotes, which not only lower the temperature of a room about ten degrees Fahrenheit, but give a dampness to the cool air. Even the greatest preservative of health in a warm climate—the cold bath—may be abused ; and Dr. D. Stewart has sometimes traced diseases of women to its having been imprudently continued during the catamenial periods. Thus cold, under its many modes of application, tells most on the weakest organ, originating uterine disease in India, as it does in England. Travelling must not be lost sight of as a cause, or more often, as an influence likely to confirm uterine affections ; for if the wives of officers accompany their husbands in Upper India, they may have to march at night, travelling twenty miles, on roads that resemble the dried up channel of a mountain torrent, and although the spread of railways over India has rendered locomotion much less detrimental to patients, still the bullock-gharrie and the palanquin must be often used, and their distressing to-and-fro jerking motion aggravates the suffering attending most pelvic complaints.

One characteristic symptom of uterine disease in India is dysentery, as I have already stated. It is the aggravation of catemenial diarrhœa, and of that which attends on chronic uterine disease. Several Indian practitioners whom I have questioned on this point, state, that diarrhœa and chronic dysentery are frequently met with, either as causes, concomitants, or sequences of uterine inflammation in Eastern localities; and Dr. D. Stewart has repeatedly demonstrated by

means of the speculum, to his pupils in the native hospital at Calcutta, that many cases, admitted as dysentery, were due to extensive ulceration of the neck of the womb, reacting on the intestine.

The march of uterine disease in India is more rapid than at home; both acute and chronic inflammation of the womb tell more forcibly on Europeans when residing in a hot clime, than if suffering from the same complaint in their native country. The muco-purulent discharge and the loss of blood are more considerable, both in India and after returning to Europe; the nervous symptoms are more severe and eccentric; debility and prostration of nerve-force are more intense and felt at an earlier stage of the complaint. Such are the results of observation, and they harmonize with what might have been anticipated; for, supposing uterine inflammation to have become established in the European resident in tropical climates owing to the action of the causes which I have enumerated, it stands to reason that the progress of the complaint will be accelerated by the continually recurring action of the same causes. Its march may share the rapidity of most abdominal affections in the tropics. The various forms of remittent and intermittent fevers, which constitute the "common fever" of each tropical region, may intervene, and as these affections single out the weakest organ, for a time they will give an additional impulse to the uterine inflammation, while the ever-persistent action of intense heat increases that radical debility which fosters local congestion.

If, as frequently occurs, uterine disease remains *undetected or* without adequate treatment, it is more

likely to become worse in a given time, than if the same patient had remained without treatment in a temperate climate. Under these circumstances, women are invalided, sometimes because the amount of uterine disease is really considerable, but oftener because the patients have not within them latent energy enough to permit the cure of a moderate amount of disease, although tonics and surgical treatment be fairly tried, in the plains or on the hills.

CHAPTER V.

PREVENTION AND TREATMENT OF DISEASES OF WOMEN IN TROPICAL CLIMATES.

PREVENTION and treatment,—for many precepts serve both purposes, and I take the word treatment in its widest sense. I shall, of course, sketch the general principles that should guide the medical and surgical treatment of uterine disease, as defined in the preceding chapter, without often entering into details with which I suppose the medical man fully acquainted, and which are useless to a non-professional reader. I shall, on the contrary, fully consider the rules of hygiene calculated to greatly diminish the frequency of uterine disease, mitigate its severity, and promote its cure. The first part of this chapter relates to the best way of preventing and of curing uterine affections in India; the second part refers to what women have to do for the recovery of health after their return to England. Many rules of hygiene apply to both sexes; and the Handbooks* lately published by Dr. Moore and Dr. Mair may be consulted with great benefit.

My first advice to a young lady just arriving in India, or in any other tropical country, is to begin by leading a very quiet life, so as to learn how to adapt

* *For titles of these works, see Preface.*

herself to the climate, to obviate its inconveniences, and to ward off its dangers, before subjecting her constitution to any fresh trial of strength, such as going out much, going up country, or rushing into marriage, all good things when taken in due course of time, but dangerous when taken all at once.

While getting accustomed to a new country, the young emigrant should look out for some lady who has known how to live long in India in tolerable health, with the view of obtaining from her such advice as can only be the result of local experience.

Clothing.—Heaven forbid that I should trespass on the hallowed ground of dress, but the intelligent lady mentioned in the last paragraph will be able to say how the requirements of climate are to be combined with the due observance of Paris fashions. I shall only repeat that as thermantidotes strike damp, as well as cold, insufficient clothing is sure to lead to disease ; that in India flannel is as useful to women as to men ; and that warm clothing is wanted all over India during the cold and the rainy seasons, more particularly in the hills. Ladies may take to themselves some of the suggestions respecting the dress of the weaker sex, given by Dr. Blanc, on returning from the Abyssinian campaign :

" Exposure to the direct rays of the sun is bad, and ought, as a rule, to be carefully avoided, religiously so from ten to three, during those hours of intense heat : even before and after that time, a certain amount of precaution should never be omitted. First of all, black, red, or any dark-coloured cloth clothes should never be worn ; and although the head should be protected by a good covering, and the

many folds of a white muslin band twisted around the hat or cap, turban fashion, still the chances of sunstroke will not be so much in relation to that wise protection as to the nature and quality of the clothes themselves. A flannel shirt, and a good, thick, white cotton coat are, above all things, the best. It is an error to believe that, the head once well protected, there is no danger; a very deplorable mistake. The effects of the rays of the sun on the body, specially on the spine, are much more dangerous; and if ever I found myself in such a position as to be unable to fulfil both conditions, I would not hesitate in guarding against the greater danger, and protect the body in preference to the head. It is not correct, either, to assert that very light clothing is more agreeable: flannel and cotton, both bad heat-conductors, are infinitely more pleasant, after a while, than the first impression produced by the muslin shirt and the very thin linen coat; both, of late, very much approved of. The neck should be as free as possible, no part of the clothing interfering with the circulation in any way. A large cotton or silk band should always be worn around the loins, and the whole body, if possible, protected from the direct rays of the sun by a white umbrella."

Bathing and Skin Hygiene.—Instead of repeating truisms on the admirable effects of cold bathing for the strong in tropical climates, I will draw attention to the great advantages to be derived from warm bathing when there is considerable exhaustion or nervous irritability, when there is uterine or some *other internal* disease, and when the skin is greatly *tried. I mean by* warm bathing in India, a bath

heated up to from 90° to 95° F.; this temperature being maintained while the patient is in the bath by the addition of hot water, according as the medical man may advise her to stay in—half an hour, an hour, or longer. There is a great deal to be done by this means for the relief of disease in India, when there will be an abatement of the strong national prejudice that exists against warm bathing, for the cure of disease. Another way of giving the warm bath is to let the patient enter it, we will say at 90° F., and leave it on feeling chilly from the gradual cooling down of the water. It might be advisable to stop in longer in many cases, but it should not be done without medical advice. Indian practitioners best know how to treat the hard-worked or actually diseased skin, but I suggest the use of a weak solution of ammonia, or of acetate of ammonia, as a lotion in cases of skin irritation, in which there is no open sore. My reason for doing so is, that I have found a lotion made with one tablespoonful of liquid ammonia to one or two pints of cold water, to afford immense relief to patients driven to desperation by the irritation of widely-spread nettlerash. I have also seen the use of this lotion check the tendency to boils in unhealthy women who had been much troubled by their recurrence for years.

Diet.—It has not been found difficult to persuade our countrymen who go to the Arctic regions, that they are to imitate the Esquimaux in their principles of diet, in order to keep themselves warm. The officers have no objection to eat every day from five to six pounds of pemmican—that is, meat and fat pounded together—while the men can manage a daily allow-

ance of about ten pounds. It is, however, difficult to make Englishmen understand that in India their diet ought to somewhat resemble that of the Hindoo. The heat of the climate will to a great extent provide for the warmth of the body, so the main object of eating is to supply materials for the ever progressing reconstruction of our tissues. When I say that Englishmen and women should imitate the Hindoo diet, I only mean that they should consume less meat and fat than in England, not that they should eat the enormous quantities of rice, to which their stomachs have not been gradually fitted. Greasy made dishes should be avoided, but curries commend themselves, as the result of a highly judicious conservative instinct. All this applies doubly to women, because they cannot take the same amount of exercise as men do, so they must become bilious and dyspeptic if they be not temperate as to diet.

Stimulants.—All medical men agree to reprobate the large consumption of stimulants that the national love of drink, thirst, idleness, and languor, too often suggest to our countrymen, as the best way to palliate the inconveniences of an Indian climate. There is no doubt upon my mind, that notwithstanding all that has been said about the temperance of Anglo-Indians of the present time, they take, under one form of drink or another, more alcohol than is good for them. While knocking the billiard balls about, men toss down brandy and soda, as if it were the thing to keep the liver in right order. With regard to the amount of stimulants habitually consumed at mess, it depends on the example set by the commanding officer, and I am told he does not always set an example of tem-

perance. If any officer were to ask a medical man what was the quickest way of getting liver disease in India, he would say, "Dine every day in a hot stuffy room with a lot of good fellows, so that you may remain two or three hours eating and drinking much more than you would otherwise do if you were dining alone, or with a friend or two." I should therefore advise the abolition of the mess during the hot and the rainy seasons. During the cold season it will be less damaging to the system to practise in common the noble art of eating and drinking too much.

From what I am told of the three capitals of India, the consumption of stimulants might be lowered with advantage to health; but Dr. Cornish knows Madras well, and he has lately vouched for the temperate habits of its Anglo-Saxon community. At any great station throughout India, society is just as exclusive as in any small country town in England—society being Military, Civilian, or Independent; the latter class comprising Railway Officials, Planters, and Merchants. With regard to the ladies belonging to the two latter classes, many that I have questioned reported themselves as not exceeding what I should consider an ample allowance: a pint of bitter ale at one meal and two glasses of sherry, or three of claret, at another meal; but some of the wives and relatives of officers have given me to understand that they often exceed this allowance. The young wife of an officer, who was stationed in the Punjab two years ago, tells me that her daily allowance was two pints of bitter ale, half a bottle of sherry, and at night "a *peg*"—*that is*, hot brandy and water, made with a

full wineglass of brandy—and this lady assures me that her lady friends at that station were not more abstemious. I hope this is an exaggerated statement, and it does not follow that what is true for one station is true for all; but if ladies do really take more than is good for their health, how can it be otherwise whenever officers do the same, and ladies dine at mess once a week in some regiments? With regard to the total abstinence from stimulants in India, the medical officers who served in the last Gold Coast campaign agree with Dr. Blanc, speaking for those who went through the Abyssinian war, that our troops were better for a moderate amount of spirits, taken at sunset, after the fatigues of the day. They agree that it facilitated the digestion of indifferent food, favoured sleep, and kept in check a very distressing state of depression and nervous irritability, the result of heat and fatigue. Their experience related, of course, both to officers and to men, and many of the former who began the Gold Coast campaign with prejudices in favour of Teetotalism became convinced that all were better for a small amount of some stimulant, taken after the fatigues of the day.* Dr. Blanc's remarks on the subject are worth reading:—

"Never drink anything stronger than tea or coffee before the sun drops towards the west; not that stimulants, in moderation, are entirely to be set aside; on the contrary, in the afternoon, the European will thoroughly enjoy his ride after a moderate meal, washed down with claret and water, or a glass of beer; and in the evening, a glass of brandy and

* *Dr. Parkes's Report, already quoted.*

water is more a necessity than a luxury. But beware of the morning dram! Woe to the habitual drunkard; waking in the morning, weighed down by the last night's debauchery! No going out into the sun for him! and even should he remain quiet, trusting to the protection of his hut or tent, heat-apoplexy will some day seek him there—a ready prey for ever-present death. Woe to the total abstainer! exhaustion and debility, though not so fatal as dissipation, end but too frequently in the same way. To avoid, as far as lies in his power, both sunstroke and heat-apoplexy, the motto of the European traveller in the sunny East should be, 'Be moderate in all things.' Use, but do not abuse; and should he willingly transgress that golden rule, he may feel certain that his bones will lie, uncared for, by the wayside; home-friends, those dear to him, will lament his fate, and speak with horror of the dreadful African climate, whilst the unfortunate wanderer has fallen a victim, not so much to the climate itself, as to his carelessness or ignorance of the simplest, most elementary rules of that important knowledge—how to avert and control the morbid influences that surround him on all sides."

Testimony runs high in favour of bitter ale as very suitable to India, and Sir Hope Grant used to repeat, that without it he could never have stood the terrific fatigue and excitement of the siege of Delhi.

Exercise.—Whenever a lady finds herself creeping into inactive habits, let her remember that geese enlarge their livers for Strasburg pies, by remaining all day in a dark, hot, small chamber, and by taking very nutritious food. I have no hesitation in saying

that whatever chronic complaint a lady may be suffering from, if it permanently prevents her taking exercise, she had better leave India. The Rev. Dr. Badger, so well known in India, not only as chaplain to the army, but as an accomplished Arabic scholar and valuable political agent, tells me that those Englishwomen who in India busy themselves about their households, and otherwise keep up their active home habits, generally enjoy the best health. An old friend, Dr. Dundas, who was for twenty-three years medical superintendent of the British Hospital at Bahia, was convinced that European women feel the depressing effects of warm climates more than men, on account of the greater indolence of their habits. All that relates to men, applies, in a limited sense, to women, and I repeat Dr. Robert Jackson's remarks, that in the East and West Indies, European troops were never so healthy as when actively engaged under solar influence, and never so sickly as when stewing in stuffy barracks.

Any medical man can easily understand why bodily inaction causes disease of the liver, and the process has been well explained by my friend Dr. Murchison.*

"Insufficient muscular exercise in the open air may derange the functions of the liver. It is well known that sedentary habits and confinement in badly ventilated rooms tend to induce derangements of the liver. It is also a common observation that persons who have eaten and drunk too freely have not suffered

* "*Lectures* on Functional Derangement of the Liver." *London : Smith* and Elder. 1874.

from their liver, so long as they have led an active life in the open air; but that as soon as, from change of occupation, or other causes, they take to sedentary habits, without any corresponding change in diet, derangement of the liver ensues. Again, every sportsman who has suffered from hepatic derangement knows the effect of a single day's hunting or shooting in clearing his complexion and relieving his symptoms. A want of regular exercise in the open air leads to derangement of the liver, by causing a deficient supply of oxygen to the system, as the result of which, the oxydizing processes which go on in the liver and elsewhere are imperfectly performed, and there is a tendency to the accumulation in the system of fat and of the imperfectly oxydized products of disintegrated albumen."

Ladies can generally take exercise without exposing themselves to the heat of the midday sun; should they be obliged to do so, they should take a cup of coffee and a biscuit before mounting—for walking in the sun is out of the question, as the reflection from the heated ground is far more painful than the direct rays of a tropical sun, if not as dangerous. A few feet above the ground, the evil effects of that radiation are far less; and also by riding, the great exhaustion and excited condition of the circulation are both avoided. In India, riding is a lady's best exercise, before sunrise or after sunset, and the following advice of an old Indian officer* will be acceptable to many who may not have seen his work:—

* "The Barb and the Bridle," by "Vieille Moustache," chap. *xix.*

"All riding in India, except in cases of absolute necessity, should be done very early in the morning. The lady should be in the saddle soon after gun-fire (five o'clock). By the time she arrives at the galloping ground (in a large station or cantonment generally the racecourse) the sun will be up, so quickly does it rise, with scarcely any twilight, in India; but its rays are not then vertical, nor is the heat either oppressive or injurious until much later in the day. A couple or three hours' riding is sufficient for health, and the great thing is to go home quite cool; the bath and breakfast are then most enjoyable. Evening promenades are, as a matter of fashion, and indeed of reason, usually attended by ladies in carriages. There are many, however, who prefer riding on horseback again in the latter part of the day; but experience proves that evening riding on horseback is not good, as a rule, for ladies. Exposure to the sun on horseback, or indeed in any way, should be especially avoided, as should also violent exercise of any kind, that on horseback not excepted. The rattling gallop, which is not only exhilarating but healthful in Leicestershire, is inadmissible in most parts of India, where extremes of any kind are injurious. Finally, I would respectfully impress upon every lady who is likely to go to India, those especially who, having been born there, have been sent home for their education, that they should avail themselves of every opportunity in this country, of becoming efficient horsewomen. To be able to ride well is very desirable for a lady who is to pass her life in Europe, in India it is absolutely indispensable; and if the lady's equitation is neglected in *early days at home*, she will find herself sadly at a loss

when she arrives in India; for although there are plenty of thoroughly competent men there, who could instruct her, their time is taken up with teaching recruits at the early time of the day at which a lady could avail herself of their services."

Sleep.—In a tropical climate, more than in any other, "sleep is great Nature's second course;" and an irremediable inability to sleep in India should be sufficient reason to invalid an European. Sleep can often be procured by making the late meal a light one, by taking less stimulus, by some suitable medicine, sedative or otherwise, and by change to some other station, or to the hills. I have already shown the imperative want of local experience, to know what to do, in so large an empire as India; and a striking illustration of this want is apparent from the conflicting advice given by competent advisers respecting sleep, according to the part of India they know best. Dr. Mair, writing in a sea-coast town like Madras, where there is dew and land-winds, says:—

"Sleeping during the night in the open air at any time during the year is most objectionable, and particularly so when the person is exposed to the rays of the moon, as blindness has sometimes resulted from such exposure; while paralysis is occasionally produced by the direct action of the land winds, which set in early in the morning."

Writing in the Punjab, where the night air is often most oppressive by its suffocating stillness, Dr. de Renzy says:—

"The obvious plan of preventing the mortality from heat apoplexy is, to let the men adopt the custom of the natives, and sleep out in the open air.

I adopted this plan myself for years, with the best effect. My children all slept out for several months in the year, and I never had the smallest reason for supposing that they suffered the slightest injury from doing so; but, on the contrary, they were able to enjoy sweet refreshing sleep when it would have been impossible inside. In 1865, one of the hottest years ever known in India, my commanding officer, at my request, insisted upon every man sleeping outside, and I had not a single case of heat-apoplexy that year, although another regiment quartered at the same station suffered severely."

Writing on the western coast of Africa, Dr. Horton says, "Take care of sleeping with the windows open, for I have repeatedly seen it bring on a severe attack of dysentery, in those who were only suffering from it in a chronic form, from sleeping with open windows, so that the cold air fell directly on the body."

Dr. Moore, a Rajpootana official, makes the following comprehensive remarks on this subject:—

"The night punkah is also very necessary in some parts of India, where the oppressive sultriness of the night forbids sound and refreshing sleep. But even this may become a source of danger. The punkah-puller is as likely to go to sleep as his master, when the wind from the punkah ceasing, the European becomes drenched in perspiration. The punkah-man suddenly wakening, commences a vigorous pull, and rapidly cools the sleeper by the evaporation thus produced—the result being chill, and its consequences. Or, while cooled by the action of the punkah on one side, the other half of the body in contact with the *bed is wet* with perspiration. The sleeper turns, and

the process of evaporation, as above described, commences, with perhaps similar result. There are, doubtless, many parts of India where, from the extreme oppressiveness and sultriness of the night atmosphere at certain seasons, the punkah cannot be dispensed with, and the least of two evils, viz., the chance of chill and its consequences, must be chosen, instead of the certainty of the debility and destruction of health attendant on continued sleepless nights. But in the more northerly districts the punkah may often be dispensed with, and in such places as Bombay and other localities generally favoured with the sea breeze the punkah is scarcely required during the night.

"Sleeping in the open air would at least secure due breathing space, but it is a practice which cannot be generally recommended. In the more malarious and damper portion of the peninsula, such indulgence should *never* be permitted, as chills from land winds and sudden breezes are liable to result, and as malaria is supposed to be more powerful during the hours of darkness than in the rays of the sun. But there are parts of India where sleeping in the open air during the very hot weather is permissible, if not actually more advisable than subjection to the uncertain action of punkah, thermantidote, or tatty. In those countries of Western India where the hot winds blow steadily in one direction by day, and where heated, if not hot, winds continue far into the night, the cot may with safety be carried into, and used in the compound, with some chance of refreshing sleep."

Change.—If the Romans invented change of air, we have certainly made the remedy our own, by the importance we attach to it, and by the frequency of

its adoption. When the Old Company was restricted to the coast, a sea voyage was the only possible change, and it still remains the most powerful way of recruiting the strength of an Anglo-Saxon. The observations of Dr. Beneke and of other authorities, have shown that sea air is an oxidizing agent of great power, and that nitrogenous and sulphur-holding tissues more rapidly disintegrate under its influence. This is why at home many patients with hepatic derangement, derive so much benefit from a residence at the seaside and from sea bathing, and it may to a certain extent explain why Bombay and Madras are somewhat more healthy than Calcutta. Invalids prostrated by the hot winds and long continued heat of Central India, are greatly soothed by the purer sea-air and moist sea-breeze ; neither should it be forgotten that we are children of the sea ; to us our home and our empire, and that its sight acts on us, as do their native mountains on the Swiss, by reviving the energy of the ganglionic nerves that preside over nutrition.

The little "pick me up" of Calcutta is to go down the Hoogly in a tugboat, for a two or three days' sail. A voyage to Madras, Moulmein, or Ceylon is, of course, of more permanent benefit. For obvious reasons the hills are more suitable to the ladies, than the sea. With regard to their advantages I can add nothing to what has been said at page 16. I repeat, however, that they are only good to preserve in health the strong, and to cure those who have no organic disease, and whose constitutions have only suffered from work, excitement, and the climate

FEMALE HYGIENE IN INDIA.

What I have previously stated applies to women, as members of the Anglo-Saxon race; what follows relates to their special peculiarities as women, and I shall be brief on many points which can be found more elaborately treated in another work.*

Cold Bathing.—The strengthening influence of the cold bath or cold shower-bath is so well known that, except at menstrual periods, the practice should very seldom be relinquished; indeed I should not insist on what is so obviously useful, did it not sometimes occur, that women in India have so little power of reaction, as not to be able to bear their moderately cold bath; then the skin remains cold and uterine congestion increases, so that Indian practitioners have sometimes attributed uterine disease to this cause.

Swimming is also admirably calculated to invigorate the inhabitants of a hot climate. The native men and women swim, so do the European male residents, and they might take measures at many stations to enable their wives to enjoy the same healthful exercise.

Vaginal Injections.—My respect for the opinion of many medical men who have practised in the East and West Indies leads me to believe that, even when not inflamed, the womb and vagina are often in an irritable condition, while uterine and vaginal secretions are unusually abundant; and

* "Elements of Health and Principles of Female Hygiene." *Henry Bohn*, Henrietta Street, Covent Garden.

Dr. Duncan Stewart even avers that there is a morbid condition of these secretions, which so react on the womb as to inflame it. Even if there be some exaggeration in this statement, it is evident that the habitual use of cold water vaginal injections is a good preservative against uterine complaints, and that the best means of enabling European married women to prolong their residence in a hot climate, is to impart to the womb, by means of a vulcanized india-rubber syphon syringe, a portion of that bracing influence so largely given to the skin by the daily use of cold water. A syringe made with a green ball had better not be taken to India, for it is a composition that does not stand heat. Mr. Coxeter of Grafton Street East, tells me the best instrument for Indian wear and tear is the syphon syringe with a *black* india-rubber ball, which is made of pure india-rubber, and stands the heat well if kept in constant use. Whenever a medicated solution is used, the instrument should be washed out with plain water, and as all instruments get out of order, two should be taken.

For Indian use, I advise the same kind of injections I find most useful in England. A drachm of acetate of lead in a pint of cold water, once or twice a day, is the best, whenever there are signs of acute inflammation or considerable tenderness of tissue. A drachm of a powder made by mixing an ounce of alum with a drachm of sulphate of zinc, to a pint of cold water, used once a day, is the best injection, when the acute symptoms have subsided. When I *am* asked what to do to prevent a relapse of uterine *inflammation,* besides other advice I say, " Use these

two injections once a day, alternately, till you leave the country." I obtain good results from the use of the two above-named injections, and if Indian practitioners know of any better, they should say so, for borax, chlorate of potash, tannin, carbolic acid, and perchloride of iron would all be serviceable if largely diluted with water.

Menstruation.—Women should always make a point of leading a quieter life than usual, at monthly periods, when there ought to be no visiting, riding, or dancing.

Pregnancy.—The previous advice applies to the condition under consideration, but to object to gentle riding would be to deprive a woman of her chief exercise. Additional care should be taken towards the return of what would have been a monthly period had not conception occurred. There is a point in the treatment of labour to which I beg to draw the attention of Indian practitioners. Some thirty years ago, Dr. Dupierris, of Cuba, finding his patients frequently died of post-partum hæmorrhage, and that tetanus supervened if he checked flooding by the introduction of ice into the womb, adopted the plan of injecting a solution of Iodine into the uterus, immediately after removing from it the placenta and the clotted blood. Dr. Dupierris's solution was composed of half an ounce of tincture of iodine, ten grains of iodide of potassium, and one ounce of distilled water. This plan checked flooding and had also the advantage of preventing that form of puerperal fever that depends on uterine septicæmia. The success of the plan was so great that it was adopted by several Cuban practitioners, and it seems to have stood the

test of time, for Dr. Dupierris published an account of it, in 1870,* substantiating his assertions by numerous cases. I have no personal experience of this mode of treatment of labour, but I have repeatedly injected a solution of tincture of iodine into the unimpregnated womb, in cases of uterine metritis, without untoward symptoms, and during the last few years so many able practitioners have with perfect impunity injected into the womb, soon after delivery, a solution of perchloride of iron, to check post-partum hæmorrhage, that I think the plan might be as useful in India as in Cuba, to prevent flooding, septicæmia, and dysentery. Perhaps the uterus would respond to this stimulation, by a more vigorous action, and that defective involution would not so frequently follow parturition, when our countrywomen are confined in India.

Convalescence after Confinement and Miscarriage.—The same rules should guide the recovery from parturition and miscarriage; it is not too much to ask that in both cases the womb should have a month's rest to recover its proper size, and for the tissues of the parturient womb to resume the structure proper to them when unimpregnated, so the patient should sleep alone. In both cases she should be kept a good deal on the sofa, visiting should not be thought of, riding would be injurious, and I am told that in India women often ride much too soon after confinements. I cannot say when driving should be per-

* Dr. Dupierris, "De l'efficacité des Injections Iodées dans la Cavité de l'Utérus pour arrêter les Métrorrhagies qui succèdent à la délivrance, et de leur action comme moyen préventif de la *Fièvre Puerpérale.*"—"Thèse de Paris," 1870.

mitted; sooner than in England I opine; and of course sooner after a miscarriage than after confinement. I know this advice will strike many as exaggerated, but during the last twenty-five years I have always found that my most intractable cases of uterine disease originated in a miscarriage, and Hippocrates had already found, that "abortions are more dangerous than ordinary parturition, the uterus being liable to ulceration or inflammation—a condition most serious."

TREATMENT OF UTERINE DISEASE IN INDIA.

Dr. Duncan Stewart, Dr. Scott, and many other Indian practitioners, fully adopt the principles of treatment which have been carefully explained in a work* of which this little book once formed a chapter. They do not believe that the womb escapes from the general rules of pathology, and maintain that uterine diseases require local or surgical measures, as well as constitutional remedies. Indeed, they consider constitutional remedies, such as quinia and steel, less useful in India than in England, and rather build their hopes of recovery upon the application of nitrate of silver or of stronger caustics to the inflamed or ulcerated surface of the womb, both in the native women and European residents. It is often found that, in India, steel produces so much nervous irritability in women, that its exhibition cannot be continued, however well indicated by theory, and Mr. Chippendale tells me

* "Handbook of Uterine Therapeutics." Third Edition. Messrs. Churchill, New Burlington Street.

"All riding in India, except in cases of absolute necessity, should be done very early in the morning. The lady should be in the saddle soon after gun-fire (five o'clock). By the time she arrives at the galloping ground (in a large station or cantonment generally the racecourse) the sun will be up, so quickly does it rise, with scarcely any twilight, in India; but its rays are not then vertical, nor is the heat either oppressive or injurious until much later in the day. A couple or three hours' riding is sufficient for health, and the great thing is to go home quite cool; the bath and breakfast are then most enjoyable. Evening promenades are, as a matter of fashion, and indeed of reason, usually attended by ladies in carriages. There are many, however, who prefer riding on horseback again in the latter part of the day; but experience proves that evening riding on horseback is not good, as a rule, for ladies. Exposure to the sun on horseback, or indeed in any way, should be especially avoided, as should also violent exercise of any kind, that on horseback not excepted. The rattling gallop, which is not only exhilarating but healthful in Leic tershire, is inadmissible in most parts of India, wh extremes of any kind are injurious. Finally, I wo respectfully impress upon every lady who is likely to to India, those especially who, having b born the have been sent home for their educ at the should avail themselves of every op n this country, of becoming efficient horse o be able to ride well is very desirable for to pass her life in Europe, in India it is a pensable; and if the lady's equitation *early days at home*, she will find herself s

in those previously well accustomed to its use, would make the brain feel uncomfortable, and turn both face and neck to a livid red, and I believe it, because I have seen the vaso-motor nerves thus lose their appointed inhibitory power over the blood-vessels, in several dilapidated or bedridden patients. Of calomel, mineral acids, and the bromides, I postpone to treat until considering the state of patients returned from India. With regard to surgical remedies, I refer the reader to the works already quoted, merely stating, that having tried chromic acid and carbolic acid in cases of uterine ulceration, I still find nothing so good as nitrate of silver, as an occasional application to a diseased or ulcerated cervical mucous membrane.

The Return Home.—Long-continued and irremediable sleeplessness, long-continued inability to take any exercise, and spanæmia, have been already mentioned as sufficient reasons for invaliding women. When these conditions are caused by uterine disease, they are preceded and associated with abundant uterine losses, sanguineous or muco-purulent, or with unmanageable gastro-intestinal disturbance, or with a considerable amount of nervous disorder, hysterical or otherwise. As a rule, however, the patient is not invalided for any one of these distressing conditions, but because she gets worse notwithstanding the best treatment. Medicine, surgery, and change having proved ineffectual, she is sent home to recover the power to rally, in a colder climate, marked by those diurnal changes of temperature to which her system had been originally attuned. In the same way that it is advisable to arrive in India towards the beginning

of the cold season, so any one invalided in India, should as far as possible, arrange to arrive in England in the beginning of summer. At all events, it is most injudicious to let a patient suffering from any organic disease return home in the winter; for diseased organs have not sufficient vital elasticity to enable them to accommodate themselves quickly to any marked change of climate. The change is too sudden not to be damaging, even if the patient committed no imprudences, very excusable under the circumstances.

The route through the Suez Canal is of course the quickest, but the most fatiguing, on account of the too constant state of excitement, mainly due to the social habits of Indian life. This is, no doubt, very agreeable, but no less detrimental to those who are seriously ill; for, the excitement over, they sometimes find themselves worse than when they left India. If patients will return by the Suez Canal they should not, at all events travel as fast as they can; for six weeks is too short a time to enable their debilitated organs to cope with the bracing influences of their native land, so it would be well to linger on the road, in Italy until summer sets in. To return from Calcutta by the long sea voyage takes 100 days by a sailing vessel, and 65 days by a steamer. It does not sound well, but when time is no object, it is well to come home this way. I have already said how great is the alterative and tonic influence of the sea, and many patients arrive half cured after having been thus subjected to its influence for three months. The patient escapes fatigue and the vibratory motion of the steamer, which *is very distressing* to some of those who suffer from

uterine disease. I am glad to find that the advice I long ago gave on this point has been confirmed by official experience, for in his paper on the transport of invalids from India, Dr. Beatson states "that a large proportion of the invalids conveyed by the Cape, benefited by the long voyage, and that Dr. Muir thinks it would still be desirable to send a certain proportion by that route."

It is well to bear in mind that chloral is very useful in sea-sickness, and that a ten-grain dose of calomel should be tried when nothing else avails. While on board, a sea-water hip-bath will be serviceable.

TREATMENT AFTER THE RETURN HOME.

On returning home, although the uterine disease may not have greatly improved, the strength of patients has been recruited, and they feel so buoyed up by the pleasure of being again in England, that they at once enter upon a course of visiting, sight-seeing, or shopping, which is too often followed by a breakdown. Some are imprudent enough to leave off their flannels, and thus to expose themselves to the effects of chill, whereas the skin requires to be kept warm. Indeed, a Turkish bath, once a week, is sometimes useful to make the skin relieve congestion of the liver, the spleen, and the womb.

I have already said that others are so much benefited that they believe their native air will be sufficient to cure them; or, having been assured that this would be the case by their medical adviser, they attach no importance to the more or less constant

pain in the back, to the lessened power of walking, and to the frequently recurring vaginal discharge.

In a limited number of cases, improvement in the general health does not always tell favourably on the uterine affection; indeed it is sometimes aggravated by the return to a colder climate. My experience thus coincides with what has been noticed by Dr. J. Johnson and Sir Ranald Martin, with regard to the effects of a return home on other complaints; for vital energy is brought so low, that the system cannot accommodate itself to a sudden change of climate, and the constitution may be so debilitated by tropical influences, that a return to a cold climate may cause a renewal of morbid activity on the part of a previously diseased organ, be it womb or liver.

When patients, of either sex, return from India to undergo some serious operation, they are judiciously advised by the old Indian practitioners, who reflect so much honour on British medicine, not to have the operation performed until the blood has been renovated, and the constitution braced up, by a year's residence at home; but it would be very injudicious to extend this injunction to the cure of morbid states of the womb by surgical treatment. The system is much more liable to suffer from the continuance of an irritable sore, than from the application of nitrate of silver, or even of a more energetic caustic.

I have noted nothing peculiar in the pathological aspect of the inflamed uterine tissues in those who return to England from tropical climates. The local appearances are the same, but more marked, considering the length of time the disease has lasted. *In like manner,* the symptoms are often worse than

one would have anticipated from the duration of the disease ; and the evidences of the return of rallying power may long delay their appearance, so those who attend such patients must expect to find, that the treatment of these complaints will be often baffled by complications, protracting the case much beyond the usual period of its duration. This inability in the spanæmic to recover health, notwithstanding the best treatment, constitutional as well as surgical, is to be referred to the deteriorated condition of the blood, and to a thorough exhaustion of nerve-force ; but recovery will reward perseverance with a well-adapted tonic treatment. It should be always borne in mind, that the pertinacity of the uterine complaint often depends on patients entertaining the notion, that once returned to Europe they may suddenly change prolonged inaction for the fatigues of social life.

In the treatment of the frequent liver and gastric complications of uterine disease, the plan I depend on is to give nitro-muriatic acid before meals, and citrate of potash after meals, as well as pepsine at meals, should there be signs of weak digestive power. Unless given in large doses, the action of mineral acids on the blood is inappreciable, and when given in small doses, before meals, I believe their action on the stomach is similar to their mode of action on the tongue—that it clears the stomach of thick mucus and prepares the organ to better digest food. On the other hand, the recent experience of Dr. Horton in Western Africa, confirms the teaching of Sir Ranald Martin relative to the utility of large doses of nitro-muriatic acid, and of the nitro-muriatic bath,

in the worst forms of hepatic disease. My experience tallies with that of Dr. Murchison with regard to the utility of bromide of potassium to reduce chronic enlargement of the spleen and liver; bromide of ammonium has obtained a great and well-deserved reputation in India and other tropical countries in the treatment of hepatic congestion, and I have found it of great service in the functional derangement of the liver attended by lithæmia. Given in scruple doses, three times a day, it acts as a diaphoretic and diuretic, and exercises a powerful influence in relieving the portal circulation, and without being oxidized, it passes out of the system unchanged in the urine.

Having pointed out that the progress of uterine inflammation in tropical climates is accelerated by the frequent recurrence of complicating diseases, it might be inferred, that in attending the uterine affections of those who have returned home from tropical climates, one is liable to find treatment interfered with by the remains of partially subdued tropical complaints; and accordingly the favourable progress which had at first followed a well-directed plan of treatment may be suddenly checked, without any assignable reason, until successive biliary accumulations and outpourings clearly point to chronic disease of the liver, requiring to be treated by mercurials, alkalies, tonics, and judicious regimen, otherwise the cure of the disease will make no further progress. Some patients vomit a large quantity of bile, or pass it from the bowels once or twice a month, sometimes from worry and fretfulness, often without a known cause, and this may last for several years. The per-

tinacity of that unknown condition of the nervous system, which responds by a fit of ague to any morbid stimulus, is another notorious fact, and the long-forgotten jungle-fever may be brought back after the lapse of many years by getting the feet wet in London mud.

In confirmation of this, I may mention the statement lately made in one of our medical journals that, "A good many of the officers who served in the Ashantee expedition, and continued in the enjoyment of good health whilst so engaged, have since suffered much from the effects of the malarious diseases they contracted on the West Coast of Africa. It is one of the most curious and interesting facts connected with the medical history of that and other malarious districts, that the symptoms of fever, hepatitis, and other diseases of a congestive type, occasionally do not manifest themselves until long after the individuals have left the climate; and it still more commonly happens that the effects of the diseases which had manifested themselves at a malarious station, continue to do so long afterwards, and sometimes in a very different way from that which they did originally, in the climate where they were contracted."

I need scarcely remind the reader of the pertinacity of spanæmia in those invalided in India, if it has resisted the bracing influence of the long sea-voyage. This question of the complications by which the progress of uterine disease may be affected, is not at all peculiar to the pathology of tropical climates; it arises frequently in consultation practice. In the worst cases, disease has not only to be detected, but

the best treatment determined on will be rendered more or less ineffectual by the intercurrence of complicating affections. Uterine disease, under some one of its various forms, may be clearly defined; but this may be only one element of the case, associated with other pathological conditions, which increase the difficulty of curing the patient. In such cases, when the local complaints are grafted on thoroughly broken-down constitutions, it would be injudicious to attempt to follow up the surgical treatment of uterine inflammation, until the complete removal of all uterine lesions. Whilst these are kept in abeyance by medicated injections, the constitution should be improved by change of climate, mineral waters, or hydropathic treatment, with the view of inducing those constitutional changes which may cure the various elements of the case, should such changes not arise spontaneously in the course of time—the chief remover of chronic disease. At intervals, varying from three to six months, it would be well to test the progress made towards the restoration of the constitutional powers, by trying the effects of local treatment on the persistent uterine affection, continuing it for three weeks.

During the last twenty-five years I have known many young women sent out to India, in whom menstruation had been habitually so irregular as to afford little chance of the maintenance of health. I have attended patients, whose health has suffered permanently by remaining in India long after the development of uterine inflammation. Others have come back to England on account of it, returning to India before the disease was quite cured, and were

speedily obliged to abandon again their Eastern homes by a relapse of the old complaint.

I know that marriages will ever be made independently of physiological fitness and medical advice; but it would be better, before young people went out to India, to ascertain whether there was a fair likelihood of the country suiting a wife. Long years of repining at the unavoidable separation of parents from children is hard to bear, much worse if young married folks are to be long parted, and if, while young women are recovering health in England, young married men are to be exposed to temptations that gather strength from the freedom of social habits, that must ever exist in small British communities, far from home, and farther still from the wholesome restraint of public opinion. I shall therefore conclude by pointing out some of the conditions that render it wrong for a lady to take up her abode in India.

1. British women should not go to India till they are of age, and their system has taken its full development, unless they have been born in India. A dash of Hindoo blood renders it likely that India will agree, although I have known Eurasians to suffer much. The fact of having been born in India though of English parents offers a favourable prospect that India will agree.

2. Women presenting anæmia or chlorosis to a marked degree should not go to India.

3. Women who look bilious and who have marked antecedents of biliary derangement should not go to India.

4. When menstruation has been habitually morbid

in a temperate zone, women should not form permanent settlements in India or the tropics.

5. Those who severely suffered from uterine inflammation in a temperate region should not take up their abode in India.

6. Those who come back to Great Britain from tropical regions, invalided by uterine disease, should not return to their Eastern homes until some months after their cure.

I have sometimes advised a patient to return to India, when circumstances and climate looked coldly on them here, and Indian life and warmth seemed to promise better health. In one of these cases, the patient had suffered much from ague during a long residence in India, and since her return to England, eighteen years ago, she has had two fits daily, instead of one, the fits being made worse by cold or rain or worry.

CHAPTER VI.

ON THE COLONIZATION OF INDIA, AND ON INDIAN SANITATION.

IN the previous chapters I have sketched the main characteristics of the climate of India. I have shown its physiological and morbid action on the British race—that its rate of sickness and of mortality is much higher than in England—that the reproductive power of our countrywomen suffers diminution, and that their children must return to England, or degenerate; so I am prepared to answer a question that has often been asked: Can the Anglo-Saxon race colonize India? It is well to know on what terms we hold India, now that we have Russia on our frontier; and that by giving the natives an European education we are steadily increasing their power to throw off our yoke.

There are two ways of colonizing. The first is by "swarming," as the bees do, and as we have successfully done, to some well-chosen isothermal region, such as North America and Australia. The second is by intermarriage with aboriginals of a country, as did the Saxons, Danes, and Normans with us, and the Spaniards with several South American races.

Colonization by "Swarming."—In India we have found a tropical climate, and all past experience shows that our race, if kept pure from other blood, would

die out with the third or fourth generation. Nevertheless, there are some who believe that we might colonize most parts of India, while others think it would be only possible to do so in certain favourable spots. My readers will doubtless feel disposed to adopt the opinion of a very high authority, Sir Bartle Frere, who graciously wrote to me in the following terms:—"As regards colonization by swarming, your statements are most true with respect to most stations in the plains; but there are vast tracts of upland country, where Europeans thrive and multiply, and rear children as well as in Southern Europe. Such tracts are all the hills east of the heaviest rainfall on the Western Ghauts, and more than 1800 to 2000 feet above sea level. This includes a great area south of the river Tapty and north of Mysore, and a large area similarly situated on the skirts of almost every mountain range in the Deccan, much of Mysore and the Nilgherry plateau; tracts from 2000 to 5000 feet above sea level, and with a rainfall not exceeding 60 to 70 inches per annum. European-born adults have better general health in such climates than in England, but they are more liable to heart disease and to cerebral affections. Children born and reared with ordinary care in such localities seem to me not otherwise inferior to healthy English children, than children born and reared at Gibraltar or Malta. Their nervous system is, however, generally more excitable, their blood less red, and their general type assimilates to that of Australian or American-born children. Practically the general policy of our Government has hardly done justice to *these localities;* resort to them has not been en-

couraged, except by the upper classes. I believe if they were systematically sought out and utilized for the benefit of the poorer classes, soldiers and others, the average European mortality, infant as well as adult, would be much diminished. Nevertheless, I do not go so far as Dr. Archibald Graham, of Edinburgh, in admitting the possibility of European colonization of selected localities."

While expressing my thanks to Sir Bartle Frere for thus pointing out the best field for some well-devised plan of attempted colonization, I cannot profess to be so confident as he is about the health-future of these pale and excitable children; neither do I believe they would creditably perpetuate our race. These Deccan children have not the healthy appearance of the British-born, Calcutta-bred children, to whom Dr. Fayrer has lately drawn our attention; and I am about to show that the satisfactory solution of the colonization of India is not to be expected from these children. Dr. Fayrer no more believes than I do in the possibility of colonizing India, but he has well shown that even in the pre-sanitary age of Calcutta, under judicious rules, the result of the experience of half a century, rules enforced by English ladies and supervised by English doctors, we can successfully rear British children born in India. Dr. Fayrer has done so by giving us the experience of the Calcutta Female European Orphan Asylum, founded in 1815, to receive the orphan daughters of British soldiers; and although its rules have been so far relaxed as now to admit children of civilians to the benefits of the institution, both parents must in every case be British born.

"The sanitary history of this institution," says Dr. Fayrer, "is still as gratifying as it has been during previous years, and is not less remarkable for the absence of disease than for the generally vigorous state of health enjoyed by the inmates. The abstracts of admission into hospital, show that there has been great immunity from epidemic disease of any severity, and the very low mortality, as well as the small amount of sickness, proves that the European child, under proper hygienic conditions and careful physical training, may live and thrive in the plains of Bengal *almost* as well as in its native country. It is not merely in the absence of any serious disease and the low death-rate that is manifested, but in the vigorous, healthy appearance of the children generally. This was remarkably noticeable at the last yearly distribution of prizes, when the girls were assembled; and it is no exaggeration to say that their appearance on that occasion would have borne favourable comparison with that of the girls in any similar institution in Europe; and, moreover, the fresh colour and red lips of the children showed slight evidence of malaria."

What a contrast to the sickly, pot-bellied children and pallid mothers that often follow in the train of our regiments, on the move from station to station!

This institution has been thus discharging every year, for more than fifty years, a certain number of healthy marriageable girls, and it is presumable that most of them married men of their own race. If it could be stated that many of them were now alive, with grandchildren sitting on their knees, as is the *case with women* of the same age in England, then

there would be some chance of colonizing India; but this has not occurred or we should have heard of it. If such brilliant results can be obtained in the European Orphan Asylum in Calcutta and in the Hill schools, their children are but a small fraction of the British-born children in India. They are chiefly to be found in the homes of the affluent and in our barracks, and their mothers, whether rich or poor, never will have the well-built houses, nor the traditionary skill, nor the systematic firmness necessary to do the best for the well bringing up of their children in India; so the fact remains, that although they suffer much less in India, from the diseases that are so fatal to children in England —dentition, measles, scarlatina, diphtheria, whooping-cough, and thoracic affections—our children are nevertheless decimated by a frightful mortality to be only accounted for by climate. It is apparent from the following Table, drawn up by Dr. Townsend, that India tells much more on the wives of soldiers and on their children than on the soldiers, although they be all placed in similar circumstances:—

Mortality per 1000 *for Ten Years*—1860-69.

	Max.	Min.	Mean.
Men	45·93	20·11	29·98
Women	68·03	25·46	43·31
Children	145·22	71·36	94·90

1870.

	Strength.	Deaths per 1000.
Men	33,373	21·90
Women	3,519	32·68
Children	5,644	81·68

There is, however, no means of accurately showing the rate of mortality of English children in India, for

in the following Table, that I take from Dr. Fayrer's pamphlet, the mortality of British children is not only due to the climate of Bengal, but partly to barrack influences, and the power of this influence to increase the mortality beyond what it might otherwise be, has been repeatedly seen in India, in Cuba, and at home :—

Deaths of Children per 1000.

	England. Mean of 29 years. 1838 to 1866.	Bengal Presidency. 1870.
Under 5 years ...	67·58 ...	148·10
5 and under 10 years	8·80 ...	17·73
10 „ 15 „	4·98 ...	11·51

There are no statistics to enable us to estimate correctly the rate of mortality among the children of the well-to-do resident British population of India, for any such statistics would be falsified by the fact that, to a great extent, both military and civilians wisely conform to the plan of sending their children to England, even during their infancy, when they might risk their remaining in India. From what is officially recorded of the mortality of soldiers' children in India, and otherwise well known to those who have lived there some years, I think it fair to infer that in this respect we are very much in India as the French are in Algeria. It will be seen in the following Table,* exhumed from official documents by Dr. Bertillon, that while out of every thousand French or German colonists there are more deaths than births, it is the contrary with the Maltese and with the Spaniards. The effect of race thus comes

* Art. 'Acclimatisation,' "Dic. Encyclopédique des Sciences *Médicales," Vol. i.*

out clearly, and the French can no more colonize Algeria than could the Romans, whereas the Spaniards could do so, because they have in their veins a lot of African blood, derived from Phœnicians, Carthaginians, and Moors. In like manner, while the Spaniards can colonize Cuba, we cannot colonize the West Indies nor South America, neither can the French. Something similar occurs in the vegetable world, for whereas the French vine sickened at Martinique, the Madeira vine has prospered there.

Births and Deaths of the Civil Population of Algeria during 1855—56, *from Official Documents.*

Nationality.	Population, Births, & Deaths.			Natality.	Mortality.	Per 1000 of the Population. Births.	Deaths.
Spaniards ...	42,396	1946	6276	0·0459	0·0301	46	30
Maltese.....	6425	284	192	0·0440	0·0300	44	30
Italians.....	9287	366	262	0·0394	0·0282	39	28
French	89,810	3710	3867	0·0413	0·0431	41	43
Germans ...	5452	169	306	0·0312	0·0560	51	56
Totals ...	166,568	6540	5961	0·0393	0·0357	39	36

The sickly state of children, when it cannot be accounted for by defective sanitary arrangements, points to the inability of a race to colonize a country; and Dr. Fayrer has only expressed the conviction of all thinking men in India when he says, that "the child must be sent to England, or it will deteriorate physically and morally,—physically, because it will grow up slight, weedy, and delicate, over-precocious, it may be, and with a general constitutional feebleness, not perhaps so easily defined as recognised, a

something expressed not only in appearance, but in the very intonation of the voice; morally, because he learns from his surroundings much that is undesirable, and has a tendency to become deceitful and vain, indisposed to study, and to a great extent unfitted to do so;" and he might have added, unfit even to compete with an educated native of the same age. With regard to the time when British born children should leave India, it is generally allowed that they ought to leave about the seventh year of their age; and I am surprised to find that Dr. Mair sanctions their remaining in India until their twelfth or thirteenth year. It is clear that, as far as bodily health is concerned, children may often stop in India till seven; but if the training of the mind is deemed important, they should leave, so soon as they can well understand the talk of Hindoo servants; for although they mean nothing amiss, it is not what an English lady would call "nice."

Just as no race ever colonized a country in which the little ones could not play around their homes, so none ever did so in any land wherein its poorer brethren could not live, and the English cannot get on in India unless they be well off. An English workman has an English stomach, he cannot live on rice, so the Hindoo undersells and starves him out. It is indeed a matter of sad public notoriety that when our countrymen, by their own fault or by adverse circumstances, get into want, there is no hope of recovery for them, and that they must fall from bad to worse. Indeed, the Indian Government show their belief in the impossibility of colonizing India by letting these blood relations of ours rot

in the back slums of Indian towns, unless, like wolves made desperate by hunger, they rush into the country to snatch some miserable food from the timid villagers, amazed to find an imperial race can sink so low. Since I have been led to touch on the "poor whites," I would fain suggest that if the Indian Government consider them past redemption, it might at least rescue their children from ruin, by bringing them up in some training ship, or in a military school that might be founded in the Deccan, thus turning them into efficient and dutiful members of the ruling race, for when facing myriads in the glorious fights of the yet unacted future we shall ill afford to lose one Saxon heart and hand. To haggle about the expense of doing this is most miserable talk; for if our rule is a benefit to India, it can well afford to bear any expense arising out of the uncongeniality of the climate to its beneficent rulers.

Colonization by Intermarriage.—Two races have been eminently successful in colonizing; for while we have colonized North America, the Spaniards, and to a lesser extent the Portuguese, have colonized its Southern continent. They have been able to do so because their half African blood so suits—Cuba, for instance—that their rate of mortality is less, and their birth-rate larger there than in Spain; and they have moreover intermarried with whatever races they have come across, so as to make viable crossbreeds, even with the negro race. There must be backbone in a crossbreed that in Cuba has for the last ten years kept at bay the armies of Spain, and in that other crossbreed that defeated and ejected a picked French army from Mexico.

Ethnologists tell us that the Caucasian and the Hindoo had a common parent, but it is so long since our respective ancestors parted company on the banks of the Oxus, and their once common nature has been so immensely modified by the prolonged action of opposite climatorial influences, that there seems to have arisen a physiological antipathy between us, which has hitherto prevented our founding a crossbreed exhibiting in a moderate degree the good qualities of both races. It would be unfair to judge this question by the results of the marriage of our countrymen of the lower class with low caste Hindoo women, for the children were placed in the least favourable circumstances for making the most of the experiment; but fifty years ago, when there was no overland route, the Company's servants frequently had matrimonial relations with Hindoo women of a better caste, and the children were reared with every possible care. The result is, that in society we occasionally meet with men and women who would be deemed *completely* English gentlemen and ladies, did not their colour and features betray the Eastern origin of their mothers. In the public offices in India there are now men similarly born, with a capacity for business and general attainments very far above the average run of Englishmen. As a physiologist, I should have supposed that these choice specimens of the Eurasian breed, if judiciously married, would have had children better or as good as themselves; but I am told by those who know India very well, that even their children show early signs of degeneration of both body and mind, like the lower caste Eurasians; and

that with the exception of the first offshoot of the two mighty races, it is impossible to recognise in subsequent generations the great qualities of either race. Upon this point Sir Bartle Frere assures me "that the higher class Hindoo women of the last generation had not more healthy half-caste offspring than the low caste. They were an inferior race as compared with the common people, except in refinement of features, and the stoutest half-castes I have ever seen had for mothers, women of the lowest castes, and who were in the habit of eating meat." Eurasians are said not to bear the climate so well as the natives, and to be more liable to consumption than they are. Eurasians are said to be fruitful, but their mortality in early life is very great. These statements tally with those made by Dr. Nott,* respecting the cross between the Anglo-Saxon and the negro in America, for he says it is constitutionally weaker, more subject to consumption, but, he adds, less fruitful. It does not appear that their African blood has enabled the Portuguese to make a better cross-breed than we have with the Hindoo, but their experiment has been spoilt by the breeding in and in, which would necessary follow their crampt position in India, and the little blood that a small and sickly mother country could spare to its colony. Of the French Eurasians I know nothing; indeed, the little that has been written about Eurasians shows how little they have been cared for, and how little has been done for them.

Are we to consider the question settled, and that

* "Acclimatization in Indigenous Races of the Earth." Philadelphia. 1857.

it is impossible to raise the Eurasian? I hope not, for our interest in the matter has greatly increased, now that, in addition to retired non-commissioned officers, there is in India a whole army of skilled railway artificers, who most of them marry Eurasians. I hope we have more faith in our blood and in our creed. Although a healthy and vigorous Eurasian population would lessen the blood-tax we pay to India, and greatly consolidate our rule, Government has made no attempt to raise the Eurasian standard. Government knows that Eurasian children scarcely ever get a fair chance, physically, mentally, or morally, and it has not even tried the effect of school education in the Hills or in the Deccan for both sexes of Eurasians, like that of the Calcutta European Orphan Asylum. Moreover, if we find that we cross badly with the mild and inoffensive Hindoo, why not go northward for strength and stamina, why not seek more efficient mates in the Punjab?

While some will regret that our blood should have thus hitherto mixt unkindly with that of the Hindoo, many will deplore the little hold Christianity has taken of so many millions of our fellow-subjects. I think our self-sacrificing missionaries of all denominations have done as much in India as they could reasonably expect; for when, in ages of faith, Christianity presented itself, as an undivided Church, to rough and northern barbarians, in the childhood of national life, it had a far greater chance of converting them *en masse*, than now, when Christianity presents itself differently interpreted by half a dozen opposed Churches to the astute and highly-cultivated mind *of a most* ancient Oriental race.

What answer can be made to a Hindoo when he says to a missionary: "Why should I change a faith that was flourishing centuries before yours came into existence? First agree among yourselves as to the form of Christianity you think I should adopt, and I shall be prepared to consider it?" What is to be said to him, if he puts a practical question and asks a missionary: "What likelihood is there of Christianity doing me any good, since it has done so little for your countrymen who have been Christians from childhood? If Muhammadanism formerly converted millions and is now making rapid strides in India, it depends on the unity as well as on the simplicity of its creed, and when, about 1542, St. Francis Xavier did such wonders in India, Roman Catholicism was the sole exponent of Christianity, and if it did not spread, although it had India to itself for more than 200 years, still it is evident that it did not lose the ground it had once gained in India, for the Jesuits can point with commendable pride to the Christian Hindoo population that fringe the Malabar coast, from Goa to Cape Codmoran, not newly-made Catholics, but the lineal descendants of those converted to Catholicism by St. Francis Xavier. It may be said that for Protestants of all denominations to be only able to boast of 318,363 native converts in India, and the Roman Catholic Church of only 1,076,162 adherents,* is not much; but some who know India well affirm that Sir Bartle Frere is right in saying that, "in addition

* These figures are drawn from Sir Bartle Frere's charming little book on "Indian Missions, 1874." John Murray, Albemarle Street.

to this numerical estimate of the importance of Christianity, it has during the last fifty years been unobtrusively making its way to every part of the vast mass of Indian civilised humanity, and is now an active, operative, aggressive power in every branch of social and political life in that vast empire."

It is still a moot question how far we shall be able to convert India, but it is clear to me that we cannot colonize it, and that we there hold the same position as did the Mamluks for 600 years in Egypt, or rather as the Romans did in *Africa Propria*, the Algeria of the present day. They had been there for 700 years when there landed a handful of Vandals, and at their sight the native population took courage and swept the Romans and their civilization into the sea.

If such be the tenure on which we hold India, it behoves us to see how we can best reduce the annual blood-tax that its occupation must cost us, which can only be done by improving the country, and our own habits while living there.

IMPROVEMENT OF THE SANITARY CONDITION OF INDIA.

In the course of this little work, it has repeatedly occurred to me to observe that all general assertions respecting so vast an empire as India required to be controlled by local information. The remark forcibly applies to what I am about to say of the present sanitary state of India; and to make my meaning perfectly understood I will add, that what I am stating as true for the Punjab and Bengal is only

partially true for the Deccan and many other parts of India.

No doubt the gradually decreasing death-rate of British soldiers in India is to be attributed to the intelligent carrying out of sanitary improvements since 1864, when, under the guidance of Sir John Strachey, the Royal Commission on the Health of the Indian Army studied the question and suggested many improvements. To fully appreciate Dr. de Renzy's account of what has been done since then, it is well to bear in mind that the mortality of the British soldier in the United Kingdom during the year 1872, was 9 per 1000.

"The average death-rate for the period previous to 1864 was 69 per 1000, but in ten years ending in 1870, the average death-rate was only 27 per 1000 in the Presidency of Bengal, where the mortality had always been greatest. In one year of the ten it fell as low as 20 per 1000. It would not be fair, however, to attribute the whole of the reduction to sanitary improvement, as the two periods are not strictly comparable, because of late years, owing to the establishment of railway and other facilities for communication with England, many invalids are now removed for change of air to England, who, under the former arrangements, would have remained in India, and in many cases died there. The ratio of invaliding has more than doubled in the last ten years. Moreover, in the early part of the century, in fact up to the mutiny in 1857, the army was almost incessantly engaged in war, and the limits of the empire were steadily advancing. On the first occupation of a province, there was of course no

proper barrack-accommodation. Native buildings had to be used as shelter for the troops, and in many cases great overcrowding was unavoidable. A large amount of sickness and mortality necessarily followed these conditions. On the other hand, the decade closed in 1870 was a period of profound peace. No fresh acquisitions of territory were made, and before the first two years of the decade had closed, the troops were everywhere well provided with barracks. Every man was allowed 90 superficial and 1200 cubit feet of barrack space, an allowance enjoyed by no other troops in the world. With the provision of sufficient barrack-accommodation, there was an immediate improvement in the health of the troops, the death-rate falling to 21 per 1000 in 1863. Great attention was given to conservancy. Excreta, solid and liquid, used previously to be deposited in deep cesspits near the barracks, a practice which caused one of the most terrible epidemics of cholera at Mianmir in 1861, when one-fourth of the garrison of 1700 men were killed in a few days. Cesspits were universally abolished by the Commission, and arrangements were made for carting excreta, solid and liquid, a mile or more out of each station. The latrines have been for years on the dry-earth system, which answers admirably in preventing offensive smell. Military cantonments are now models of cleanliness. The conservancy establishment is very costly, but there is no doubt it is thoroughly effective. The clothing and diet of the troops were greatly improved, and great attention given to prevent duty being carried on in a manner injurious to health. Surface-drainage

was looked to, and made so effective, that little remains to be done in the matter. The subsoil being perfectly dry already, there was no occasion for subsoil-drainage. A code of regulations to be observed on occasions of cholera was prepared and published, the main principle being that, on the appearance of the disease, the troops were to quit their barracks and go into camp. Obedience to the rules has, on some occasions, subjected the troops to heavy losses from sunstroke ; but, on the whole, the balance of advantage is decidedly in favour of the rules."

The preceding statements are confirmed by the following table, taken from Dr. Fayrer's pamphlet, although 1869 is marked by an awful mortality, not entirely attributable to cholera :—

Statement showing the Mortality per 1000 *of Average Strength among European Troops in the Three Presidencies during* 1871, *compared with that of each year since* 1858.

Years.	Bengal.				Madras.				Bombay.			
	Cholera.	All other causes.		Total.	Cholera.	All other causes.		Total.	Cholera.	All other causes.		Total.
		In hospital.	Out of hospital.			In hospital.	Out of hospital.			In hospital.	Out of hospital.	
1858	9·16	91·39	10·52	111·07	...	...	...	...	...	...	...	...
1859	8·67	35·30	1·38	45·35	...	...	...	...	...	...	...	...
1860	12·04	24·14	·59	36·77	...	19·1	2·04	21·14	...	...	...	31·70
1861	23·73	21·06	1·14	45·93	...	14·5	1·8	16·3	...	...	...	24·72
1862	9·61	17·44	1·06	28·11	...	17·09	1·7	18·16	...	...	...	24·60
1863	4·09	18·85	1·18	24·12	...	16·5	3·01	19·51	...	...	...	16·14
1864	2·55	17·39	1·16	21·10	...	16·5	3·6	20·1	...	14·4	1·5	15·9
1865	3·12	20·40	·72	24·24	...	19·5	2·9	22·4	16·0	17·8	1·3	35·1
1866	1·37	17·34	1·40	20·11	2·3	17·9	1·5	21·7	0·6	10·7	1·4	12·7
1867	13·84	16·16	·95	30·95	0·36	15·34	2·3	18·0	5·0	12·4	1·9	19·3
1868	1·81	16·94	1·36	20·11	0·5	15·8	3·0	19·3	0·8	12·1	1·0	13·9
1869	16·46	24·98	1·45	42·89	2·2	18·8	2·3	23·3	5·2	13·7	2·5	21·4
1870	·63	19·74	1·53	21·90	3·5	13·4	2·3	19·2	0·1	15·3	1·3	16·7
1871	·71	16·07	1·05	17·83	3·32	15·40	1·38	20·10	·09	13·10	·83	14·02

In his report on Madras for 1873, Dr. Cornish mentions, that instead of 69 per 1000 for all India, the death-rate in the European army is now in the three Presidencies 28 per 1000, while, as regards Bombay and Madras, it is 22 per 1000. In the civil service of the Madras Presidency, the mortality has fallen in the last twelve years from 14·1 per 1000 to 11 per 1000, and he adds, "there can be no question but that the official classes in India have been much less liable to die from cholera, fevers, and dysentery of late years. As regards the first of these, the hygienic conditions have improved; and in regard to the two latter diseases, medical treatment has advanced, and materially diminished the risks of life."

These satisfactory results are partly due to the improvements made in some of the large towns and important stations—and all honour to our engineers; nevertheless, it seems clear that they have damaged the sanitary condition of the country, taken as a whole. Railways lead to the dissemination of diseases that used to be confined to a much more restricted area, and cholera now rides at ease on the 8000 miles of rails laid down for other traffic. Dr. de Renzy is emphatic on this point. He says: "It is an undoubted fact that cholera epidemics in the Punjab are becoming much more frequent. Under native rule, the province enjoyed long periods of rest from the disease; but, owing to the improvements effected in locomotion under English rule, an interval of two or three years' immunity is the longest that can be hoped for. In the Peshawur valley, cholera was unknown in the long interval between 1805 and 1858;

since the latter date, there have been four terrible outbreaks."

A very competent judge* gives it as "a well-known fact that fever of a typho-malarial type has been more destructive and persistent in all those localities to which we are accustomed to point as presenting triumphs of European engineering." The engineer exults in his hundreds of miles of raised metal roads and of railway embankments through a level country, but the doctor† tells him he has somehow or other "so interfered with the natural drainage of alluvial plains as to develop malaria to an extent that threatens to depopulate them." The Sanitarian tells the engineer that some of his canals have been so injudiciously planned, or so badly constructed, that they have flooded the surrounding country and greatly increased the virulence of malaria. There must be a considerable amount of truth in all this, or it would not have been lately corroborated by a distinguished engineer, Colonel Corbett,‡ who has lately given it as his deliberate opinion that the climate of Bengal has been damaged by British engineering, and he attributes the deterioration to four causes:— 1st, increased surface drainage; 2ndly, defective agriculture; 3rdly, denudation of the surface of the country of trees and other vegetation; 4thly, and above all, to artificial irrigation by canals. He says that the water-logging of the Lower Provinces of

* Dr. W. J. Moore, "Review of the Progress of Sanitation in India." 1870.

† Dr. Maclean, "On Malarial Fevers and Cholera," *British Medical Journal*, 1874.

‡ Lieut.-Col. Corbett, "On the Climate and Resources of Upper India." London, 1874.

Bengal has been increased by the surface draining of the Upper Provinces, which has thrown the water into the rivers, and renders the lower country liable to inundation, or collected in profitless marshes or tanks, which prove detrimental to health by impregnating the atmosphere with malaria. It is well known that in India the over-watering of a garden surrounding a house may be a cause of malaria, and there can be little doubt that the partial water-logging of the vast alluvial plains of India adequately accounts for the increase of malarious endemics during the last few years, and this water is often impregnated with sewage, typhoid fever, which formerly attracted little notice, has been gradually increasing of late years from Calcutta to Peshawur.

2ndly. *Defective Agriculture.*—Colonel Corbett represents the land as "imperfectly tilled and deprived of manure, but especially of the natural or green manure, for, though the ashes of certain plants and grasses are frequently returned to the soil, the fibrous or organic parts are most generally used for other purposes; that the surface of the soil, instead of being properly broken up and moistened through its capillary attraction for water, is caked and hardened into a dense crust, which checks both radiation and absorption of heat; increases its reflecting and heating properties, adds to the desiccating power of the west winds, and tends to render the ground unproductive or altogether sterile; and that water as now used, in lieu of causing the beneficial results which should accrue from its due and perfect absorption by and penetration into the soil, becomes the source of evil." *In confirmation* of these statements Sir George Camp-

bell lately asserted, at a public meeting, that as yet we have done nothing for agriculture in India.

3rdly. *The injudicious destruction of Vegetation.*—This is a well-known way of damaging a climate, as shown by the example of France, Italy, and of every land that has been cursed by Turkish sway. It is being done in America, and with regard to India the uncontrolled destruction of its indigenous forests was pointed out as sure to derange the local water supply by Dr. Hugh Cleghorn in 1851. Since then these great forests have been largely used up for the making of bricks for railways, canals, and as fuel for railways. Trees prevent the washing away of the mould by heavy rains, they enable the ground to retain moisture and to clothe itself with vegetation, which tempers the hot winds, and Dr. Fayrer* observes, "that if the destruction of trees be not altogether checked the west winds will gradually become hotter and the climate drier than it ever has been. It is often observed how completely the hot west wind of April or May, which blows fiercely, say, at Seetapore in Oude, is tempered to a comparatively cool, gentle, and moist breeze when it comes within the influence of the forest vegetation of the Terai, a few miles further north-east."

Another motive for recommending the enforcing of a certain amount of tree planting near each Indian village is the value of their leaves as litter to absorb the liquid droppings of the cattle, which now too often run to waste instead of being restored to the exhausted soil. With regard to Colonel Corbett's

* "On Certain Physical Causes that Influence the Climate and Public Health of India." *Lancet*, 1874.

very strong objections to irrigation, a visit to Lombardy would surely remove them.

It is evident that much else remains to be done to render India a less damaging climate to Europeans, but, as Dr. de Renzy well says :—

"The great obstacle to the improvement of towns is, that the native population of all classes, high and low, rich and poor, are profoundly indifferent in the matter. They are perfectly content to let things go on as they are; indeed, they greatly dislike any interference or inquiries on the part of the Government into the state of their towns. The native governments never inquired into such matters, and the people do not understand why the English government should do so. Moreover, there is an universal belief that it is quite useless, if not impious, to attempt to prevent epidemics, which are regarded as God's chastisements of sin and vice.

"There can be no doubt that the Sanitary Department, or, as the natives call it, the Safai—cleanliness—is heartily detested. Sanitary reform is found to be very difficult in England, where there is at least a large and very influential minority convinced of its value and importance. How difficult must it be in India, where all classes of natives are either indifferent or actively opposed to it—its only friends being the alien rulers! Under such circumstances it behoves the Government to proceed with caution and prudence. Undue haste in forcing on improvements would only postpone the object we have in view. With regard to cantonments, however, the case is altogether different; they are entirely under the control of the Government. They are in every case the creation

of the Government, and they exist solely for the convenience of the troops. Cantonments afford an admirable field for demonstrating by practical experiment that the prevention of epidemics is not, as the natives suppose, a vain imagination—an idea in which they have been strongly confirmed by the failure of our efforts to abate the ravages of cholera among the troops. The recent epidemics of cholera are a scandal and a reproach to sanitary science, and a recurrence of them must be rendered an impossibility, before it can hope to have any influential body of supporters among the native population. Half a dozen of the bad stations made healthy would be invaluable as a practical proof that man is as fully capable of defending himself against epidemics as against cold and hunger."

One thing is certain, that there can be no further improvement in the health of the millions who swarm on the plains of the Punjab and of Bengal so long as they continue to drink their own excrements, filtered through the loose black mould that has performed this office from time immemorial. "Of all kinds of water that are drunk, the dirty water from a surface well is the most dangerous." Such is the dictum of modern chemistry.* In England, well water laden with vegetable matter often contains a sufficient quantity of albuminoid ammonia to cause diarrhœa. In India, well water containing decayed vegetable matter also gives malaria. Very little thought is given to the immense antiquity of our villages,

* J. A. Wanklyn, "Water Analysis." Trübner and Co., London. 1874.

many are mentioned in Doomsday Book, most of them were in existence before the Reformation, and I think I shall be supported in asserting, that the well water of all our venerable villages is more or less contaminated by sewage of man and beast, and is therefore unfit to drink, particularly if the village is in a level plain. The plains of Bengal and the Punjab are singularly level, densely inhabited, studded with villages of fabulous antiquity, and the natives, only water supply is the shallow well sunk in the midst of human habitations. Did we not care for the natives, we should for our fellow countrymen stationed in the plains, and filters get out of order, or may not be used. Nice water to drink that of a favourite Delhi well, in a gallon of which Dr. de Renzy found 173 grains of solid matter, whereas the water of the London companies only contains 18 grains per gallon. Of these 173 grains of solid matter there were 40 grains of sulphates, 25 of chlorides, and a large quantity of nitrates and of nitrites of ammonia, of which there is but one grain in a gallon of Thames water. I do not apologize for giving another extract from Dr. de Renzy's admirable paper :—

"I believe that the fever, hepatitis, cholera, and dysentery, are almost certainly due to bad water. The grounds of my opinion are mainly two: 1. Because these diseases prevail at stations where no other recognised cause of them than bad water is found in operation; and 2. Because at Colaba the disuse of bad water was followed by an immediate reduction in the prevalence of the diseases in question, and, *generally, be*cause the degree in which the troops

suffer from them is proportional to the purity of the water-supply. In illustration of the first reason, I would point to Mianmir, where after repeated examinations by inspectors and deputy-inspectors of hospitals, sanitary commissioners, and others, no other tangible sources of the diseases in question has been discovered. Nothing can surpass the cleanliness of the station: the barracks are good; the troops have plenty of room; the soil and subsoil are perfectly dry; there are no marshes in the neighbourhood; the food and clothing are excellent; duty is light. The station is upwards of three miles from any native town, and there is nothing like crowding of buildings in any part of it. Some of the streets of the bazaar are seventy feet wide, and none of them less than forty feet. After a thorough examination of the station by the Sanitary Commissioner in 1867, the only fault found was that the cook-houses smoked; and in a few weeks afterwards the troops there suffered severely from cholera; later they suffered severely from typhoid and intermittent fever. Hepatitis and diarrhœa are always more or less present. The water-supply is unquestionably bad, and exposed to dangerous pollution.

"The history of Colaba illustrates my second reason. This station is a suburb of Bombay, and for many years it had the reputation of being one of the most unhealthy stations in India; in consequence of which the Government were advised to abandon it altogether as a post for troops. Cholera, fever, and dysentery were the prevailing diseases. The unhealthiness of the troops was supposed to be due to the bad position of the barracks, to the proximity

of the place to a great native city, to crowding, malaria, &c. But, in 1855, the Vehar water-pipes were laid on to the barracks, and since then the station has been healthy. With the disuse of the tainted well-water, there was a sudden change in the character of the climate. But, speaking generally, the degree of prevalence of the diseases under consideration is proportional to the security of the water-supply against pollution. Peshawur obtains a large portion of its water-supply from the filthy gutters which flow along the roadside; there we find the maximum prevalence of fevers and cholera. Dugshai, a hill-station, obtains its supply from a spring so situated that it cannot readily be contaminated. There the troops are quite as healthy as they would be in England. At Murree, another hill-station, 7000 feet above the sea-level, the supply is taken from springs much exposed to pollution. There the troops lost 12 per cent. of their strength from cholera in 1858, and in 1867 the place was again visited by a severe epidemic. Malarious fever is always present. At Simla, a beautiful hill-station, 7500 feet high, there have been several epidemics of cholera. Good water is procurable at all stations, but the system of distribution in goats'-skins, carried mostly on men's backs, is thoroughly bad; and in many cases the sources are not secured by any structural arrangements against pollution. In some cases, a sentry is posted to prevent the natives from washing their clothes or persons in the tank or well that supplies drinking-water. Persons in this country can hardly appreciate the great variety of the sources of danger to health from the use of water in India. Thus, I once saw

a man washing radishes in the sewage of the Amritsar ditch, and I was told that the milk used there is largely diluted from the same source. Milk is greatly adulterated with water in India, and I believe it is a very common medium for the distribution of cholera. The better class of natives would not touch milk taken from the milk-dealer's shop. They send their own servants to have the milk taken from the cow or goat in their own presence.

"European soldiers are exposed to some special dangers owing to the mode in which their water-supply is stored. In so hot a climate, thirst being very urgent, the supply of drinking-water must be convenient for use. In a barrack of fifty or sixty men there are usually four earthen vessels for holding drinking-water, placed in the verandahs of the barracks; the vessels hold about three gallons each, and are very commonly uncovered. To get water from one of these vessels the man has to incline it, and, in doing so, his head comes more or less into contact with the contents. Now, when it is remembered that thirst is a very common premonitory symptom of cholera, and that a person suffering from it would naturally make many calls on the water jar; also, that the private soldier in India is far from particular about washing his hands after visiting the latrine, the danger of the present mode of supply will, I think, be generally admitted. One individual suffering the premonitory diarrhœa of cholera would be very likely to taint the water-supply of his comrades in the same barrack. This is, I believe, the most generally applicable explanation of the curiously isolated outbursts of cholera that are of

such frequent occurrence in Indian barracks and hospitals. But there is another source of danger: it has been thought necessary to have the drinking-water of the troops filtered, and the arrangements for filtering are as follows:—A wooden tripod is supplied, so arranged as to support three of the water-jars already described one above the other. In the topmost vessel is placed the water to be filtered; in the middle are the filtering materials, consisting of wood, charcoal, and sand; and the lowest jar holds the filtered water. Now chemical analysis has shown that water filtered in this way is much more impure than the original unfiltered water, the reason being that the sand taken from the dry bed of the nearest stream contained various impurities. In my own regimental hospital I once found the filtering sand grossly impure, and the water that had filtered through it was of course the same. In a regiment there are some fifty or sixty filters in operation; the sand being supplied by natives, whom it is exceedingly difficult to convince of the importance of obtaining the article from a pure source, as they never drink filtered water themselves. They are apt to take whatever sand they can get with the least trouble to themselves. In one instance within my own knowledge the sand for a public institution was brought from a hole which was used as an out-door privy by the people of a village infected with cholera. I doubt whether any conceivable amount of vigilance could render the retail system of filtration I have described free from danger."

Thus with ten times the rainfall of England, there is no water fit to drink in many parts of India:—

"Water, water, everywhere,
And not a drop to drink."

It is doubtless a difficult task for engineers, for they have to bring this mass of waters under intelligent control, instead of looking on with Oriental apathy at the turning of a blessing into a curse. Whether drinkable water can be brought to every Indian village is scarcely possible, but one thing is certain, that the regulation of the water-supply is the next great step in Indian sanitation.

I said there was still another way of rendering India less fatal to our countrymen,—the judicious modification of national habits; but although individuals change their habits, nations never do. Race explains history, laws, and customs. In describing the French of his time, Cæsar well depicted the French of ours; and while we cannot be too grateful to our northern ancestors for the stamina and pluck that has carried us triumphantly through a thousand difficulties, those sons of Odin were huge feeders, and the perennial drinking of mead was their most spiritualized notion of heaven.

It is singular how all through history we have been identified with beef. When St. Augustine got settled amongst us, having been accustomed all his life to poor Italian fare, he wrote to St. Gregory expressing his disgust at the quantity of beef the Islanders devoured; but the large-hearted Pope sent him word to mind his own business and not to trouble himself about what they eat, provided they kept God's commandments, and he told him now and then to give the king and court a good feast of the beef they were fond of. As time rolled on we got to call ourselves

John Bull, and foreign nations nicknamed us "Rosbif." We are still the same as when we learnt Christianity from St. Gregory's monks: we cannot realize the idea that life can be supported without beef and animal food; we travel with it preserved in various ways and cling to extract of beef as to the last remainder of national food. With regard to stimulants, we have greatly improved on our Norse ancestry: we now believe that heaven will be thoroughly enjoyable without alcohol; but without it we do not think it possible to be jolly on earth. Indian doctors tell Anglo-Indians they eat and drink too much for the climate. Should this be true, it is so much a question of race, that I know not how to blame them. We cannot alter our nature, and if after many a century of beneficent occupation, we should have to leave India as the Romans left Africa, when the last Englishman leaves the shore, I am afraid the still rice-eating Hindoo will be able to say of him, then as now: "There goes the man who eats beef, drinks brandy, and never prays."

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THE END.

OPINIONS OF THE PRESS.

HANDBOOK OF UTERINE THERAPEUTICS.

"For many years past Dr. Tilt has sought to determine the real value of those various modes of treating inflammatory affections of the womb which have been advocated by different eminent practitioners. In giving the result of his labours to the profession, the author has done a good work. The present volume contains a great deal of useful matter; and though there are some observations in it which do not accord with our own views, yet we strongly recommend our readers to peruse Dr. Tilt's volume for themselves instead of trusting to any critical remarks. They will find its pages very interesting, and at the end of their task will feel grateful to the author for many very valuable suggestions as to the treatment of uterine disease. The different views advocated are illustrated by the notes of many curious cases, so that the reader wil find no difficulty in fixing his attention to the end of the work."—*Lancet.*

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"We regret very much that our space does not allow of a more lengthy examination of this most interesting portion of the work, and especially the last chapter relating to the pathology and treatment of hæmatocele, a disease to which the author was the first in this country to direct the attention of the profession, and which has lately, from the researches of Bernutz and Goupil, attracted considerable notice. We have said enough, however, to interest our readers in this work, and we can promise them a vast accession of knowledge of a most useful kind if they will attentively study it."—*London Medical Review.*

"We have on former occasions felt it our duty to remark upon the labours of Dr. Tilt with satisfaction, and as this is the third edition published, we have but little more to say than that he fully maintains the credit before accorded him for industry, and has added to the know-

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"We have long had on our table the fourth edition of Bennet's book 'On Inflammation of the Womb,' and the third of Tilt's 'On Uterine and Ovarian Inflammation,' works which had served to revolutionize uterine pathology and therapeutics, not, it is true, without eliciting much opposition on account of their adopting a too exclusive pathological theory, but which works must ever mark an era in our knowledge of uterine disease."—*Dublin Quarterly Journal of Medical Science.*

"Le Dr. Tilt a introduit dans la science une idée qui depuis lors a porté fruits, et qui, lorsqu'il l'énonçait dogmatiquement en 1848, semblait plutôt une assertion ingénieuse qu'une vérité probable. La pathologie utérine, concentrée presque exclusivement dans les lésions du col de l'utérus, laissait inexpliqués un certain nombre de phénomènes d'une observation fréquente. Le Dr. Tilt montra qu'on n'avait envisagé qu'un côté de la pathologie en n'examinant qu'une portion de l'organe, et il prit à tâche d'assigner une juste place aux affections du corps de l'utérus, du péritoine, et surtout des ovaires. Par une réaction facile à pressentir, le col de l'utérus fut peut-être relégué trop loin sur les derniers plans, mais on y gagna d'accorder enfin aux maladies de l'ovaire une attention qu'on leur avait refusé jusque-là."—*Archives Générales de Médecine.*

THE CHANGE OF LIFE IN HEALTH AND DISEASE.

"Le livre du Dr. Tilt a son originalité, et devait être signalé à ceux qui ne considèrent pas la pathologie des âges comme un hors-d'œuvre à l'usage des médecins littérateurs. Le traité *l'âge critique* est rempli de données intéressantes ; l'auteur, qui s'est spécialement occupé des maladies des femmes, et qui a publié sur ce sujet des travaux estimés, y apportait une solide expérience ; il avait le mérite de parler d'après sa pratique et de ne pas seulement rajeunir par une phraséologie nouvelle des citations d'un autre temps. En somme, on aurait peine à trouver sur le même sujet une monographie qui valut celle sur laquelle nous venons d'appeler l'attention. Une preuve entre autres que le livre est d'un vrai mérite c'est qu'il éveille dans le lecteur le désir de le reprendre en sous-œuvre, de vérifier ce qui parait juste, de controler par une nouvelle étude ce qui semble moins admissible, et surtout de tenir meilleur compte des phénomènes de *l'âge critique* dans l'observation de tous les jours."—*Archives Générales de Médcine*, October, 1858.

"On y trouvera une étude très bien faite et toute nouvelle des réactions nerveuses et reflexes que les désordres ovariques et utérins exercent sur toute la machine sensible de la femme. On comprendra avec lui une foule de manifestations pathologiques qui sont le désospoir du médecin clinique. Cette partie de l'œuvre du médecin anglais suffirait à elle seule pour grandir encore, si cela était possible, la reputation que le docteur Tilt s'est acquis comme praticien des plus distingués, comme savant physiologiste, et pour le placer parmi les écrivains dont les travaux ont fait faire un pas réel aux maladies de la compagne de l'homme. Ajoutons que le livre que nous voudrions faire connaître plus au long, se distingue encore par une profonde érudition, de la richesse dans le style, et une saveur scientifique qu'on ne trouve pas toujours dans les œuvres de ce genre."—*Union Médicale*, August, 1857.

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